POWER PLANT AND TRANSMISSION LINE SITING IN FLORIDA:

A PLANNER'S HANDBOOK

Prepared by

The Florida Department of Community Affairs

Division of Local Resource Management

Bureau of Land and Water Management

2751 Executive Center Cir E.
Tallahassee, FL 32301

tel. 904/488-9210

D R A F T # 2A

June 5, 1984

Funded by Grant 82-CE-CW-13-00-15-003
Office of Coastal Zone Management
National Oceanic and Atmospheric Administration
U. S. Dept. of Commerce

A Project Funded By The Coastal Energy Impact Program:

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TABLE OF CONTENTS

Page

PART I
INTRODUCTION

CHAPTER 1: SYSTEMS PLANNING

PART II
POWER PLANT SITING

CHAPTER 2: POWER PLANT SITING IN FLORIDA

CHAPTER 3

CHAPTER 4: POWER PLANT COOLING

CHAPTER 5: AIR POLLUTION

CHAPTER 6: SOLID WASTES AND COAL STORAGE

CHAPTER 7: OTHER IMPACTS OF POWER PLANTS

CHAPTER 8: ALTERNATIVES TO NEW COAL-FIRED POWER PLANTS

PART III

TRANSMISSION LINE SITING IN FLORIDA

CHAPTER 9: TRANSMISSION LINE SITING IN FLORIDA

CHAPTER 10: IMPACTS OF TRANSMISSION LINES

ATTACHMENTS

LIST OF FIGURES

CHAPTER 1: SYSTEMS PLANNING

CHAPTER 2: POWER PLANT SITING IN FLORIDA

CHAPTER 3: POWER PLANT SITING METHODOLOGIES

CHAPTER 4: POWER PLANT COOLING

CHAPTER 5: AIR POLLUTION

CHAPTER 6: WATER POLLUTION

CHAPTER 7: OTHER IMPACTS OF POWER PLANTS

CHAPTER 8: ALTERNATIVES TO NEW COAL-FIRED POWER PLANTS

CHAPTER 9: TRANSMISSION LINE SITING IN FLORIDA

Chapter 10: IMPACTS OF TRANSMISSION LINES

TABLES

CHAPTER 1: SYSTEMS PLANNING

CHAPTER 2: POWER PLANT SITING IN FLORIDA

CHAPTER 3: POWER PLANT AND TRANSMISSION LINE SITING

CHAPTER 4: POWER PLANT SYSTEMS

CHAPTER 5: AIR POLLUTION

CHAPTER 6: SOLID WASTES

CHAPTER 7: OTHER IMPACTS FROM POWER PLANTS

CHAPTER 8: ALTERNATIVES TO NEW COAL-FIRED POWER PLANTS

CHAPTER 9: TRANSMISSION LINE SITING IN FLORIDA

CHAPTER 10: IMPACTS OF TRANSMISSION LINES

PART I

INTRODUCTION

POWER PLANT AND TRANSMISSION LINE SITING: AN OVERVIEW FOR PLANNERS

Planners deal with questions such as housing developments, the location of roads, and economic development every day of the week--but a power plant or transmission line siting question may be considered only once in an entire professional career. Therefore, the Department of Community Affairs has prepared this handbook to help professional planners in Florida review site certification applications for power plants and transmission lines.

This handbook has been designed principally for local and regional planners. However, other persons who become involved in power plant and transmission line siting issues--such as local officials, consultants, utility planners and members of environmental and public interest groups--may also find this handbook useful.

This Overview provides planners with a brief checklist of topics to consider in these reviews and to serve as a summary of the key sections of the handbook. The handbook consists of four parts:

<u>Part I: Introduction</u>--Provides a brief overview of the Florida electric utility industry, showing forecasts of projected growth in power consumption in the state and projections for coal consumption in coming years. (See Chapter 1.)

<u>Part II: Power Plant Siting</u>--Reviews the Power Plant Siting Act and regulations issued to implement it; examines the environmental impacts of coal-fired power plants, such as air and water pollution, and socio-economic and transportation impacts. (See Chapters 2, 3, 4, 5, 6, 7 and 8.)

<u>Part III: Transmission Line Siting</u>--Summarizes the Transmission Line Siting Act and environmental impacts of both constructing and operating transmission lines. (See Chapters 9 and 10.)

<u>Part IV: Attachments</u>--Includes the Power Plant Siting Act, the Transmission Line Siting Act, regulations issued by the Department of Environmental Regulation, a glossary of terms, a bibliography and other reference material.

USING THIS HANDBOOK

Under Florida law, certifying a proposed power plant or transmission line is divided into two distinct phases:

- o The Determination of Need process of the Public Service Commission.
- o The Power Plant Site Certification process, coordinated by the Department of Environmental Regulation.

Planners may become involved in either or both of these processes, so both are detailed in the handbook:

a. <u>PSC Determination of Need Process</u>--Planners and other local government officials have not frequently been involved with the Determination of Need process of the Public Service Commission. However, in a sense this is the most important step in the certification process: Once the PSC has issued an order certifying the need for the proposed project, planners reviewing the site certification application are limited to dealing with issues such as mitigating environmental, socio-economic and land use impacts. Although state law gives the Siting Board the power to reject a site certification application, in practice, if the PSC certifies the need for a new power plant or transmission line, the site certification process determines only where and how the project will be built.

One reason why planners and other local government officials have not often been involved in the Need for Power determination process is that the PSC action usually comes so early in the certification process that the project is not perceived by them or by the public as a major public policy issue. Only after considerable attention has been given to the site certification application by the media does the issue usually begin to generate public awareness. By the time the proposal has begun to receive close public scrutiny, the Public Service Commission may have already issued a Need for Power order.

To help planners deal with the PSC Determination of Need process, the handbook provides two chapters specifically designed for this purpose:

> Chapter 1--provides basic information on systems planning for utility power generation, showing projections of the utility industry and the Public Service Commission for the need for new coal-fired power plants in the future.
>
> Chapter 8--discusses possible alternatives to new construction, such as energy conservation, solar power, the use of wastes for power generation and conversion existing oil-fired units to coal.

b. Site Certification Review--Power plants can have a significant impact on air quality, water quality, wildlife and vegetation. For this reason, Florida law provides for the review of power plant site certification applications by state agencies, water management districts and participating local governments. The Department of Environmental Regulation (DER) coordinates this review, and includes other reviewers no specifically mentioned in the act, such as regional planning councils. The Governor and Cabinet, siting as the "Siting Board," issue the final certification. The handbook is designed to assist planners in conducting these reviews.

Power plant site certification applications submitted to DER are complex, technical reports that may be up to six volumes in length; the issues discussed and the terminology used may be unfamiliar to a planner who rarely, if ever, deals with these subjects. Consequently, the handbook defines technical terms, explains the technologies employed and identifies issues needed to be addressed in the review process.

OVERVIEW OF PART I: INTRODUCTION

Chapter 1: Systems Planning

The Public Service Commission, using projections of the Florida electric utility industry, has forecast that by the turn of the century the amount of electric power produced from coal in Florida will be more than six times larger than in 1981. Chapter 1 summarizes these projections and presents basic information on the size and location of present coal-fired plants, as well as data on potential sites for future coal-fired plants.

To help planners better deal with the PSC Need for Power Determination process, this chapter explains essential terms such as loss of load probability, capacity factor and peak demand. Basic information on coal plants, such as what is meant by megawatt capacity and megawatt-hours of output is given, as is a review of the projected cost of new plants.

Using these coal-use projections, Chapter 1 provides a short review of the possible impacts this magnitude of coal plant construction would have on the state's economy and on the reliability of the state's electrical system.

OVERVIEW OF PART II:

THE POWER PLANT SITE CERTIFICATION PROCESS
(Chapters 2, 3, 4, 5, 6, 7 and 8)

Chapter 2: Power Plant Siting Regulations

Power plant siting in Florida is governed primarily by the Power Plant Siting Act (PPSA). Chapter 2 summarizes the provisions of this act and the regulations which have been issued to implement it. A copy of the act is included as Attachment I; regulations issued by DER to implement the act are included as Attachment IV.

This chapter explains each of the nine steps in the power plant certification process:

1. Pre-application discussions
2. The PSC Need for Power determination
3. The review for sufficiency and completeness by DER
4. The certification review and studies
5. The land-use hearing
6. The certification hearing
7. The Recommended Order of the Division of Administrative Hearings
8. The Order of the Governor and Cabinet
9. Post-certification review by DER

Each certification application is reviewed by a number of state and local government agencies. The responsibilities of each agency in this process are discussed, along with a brief review of the responsibilities of several federal agencies. Other relevant laws, such as the Ten-Year Site Plant Act and several federal environmental laws, are also summarized. A directory of agencies involved in this process is included as Attachment IX.

The chapter explains how to become a "party" to a certification case and describes the points in the certification process where local and regional planning agencies may be involved in the proceedings.

Chapter 3: Power Plant Siting Methodology

The first step in power plant certification is selecting the site of the proposed plant. This chapter reviews the site selection process reported in several recent power plant site applications and examines the criteria used by the applicant utility in each of these case studies.

The methodology used in each of the case studies is compared with the literature on the subject of power plant siting. This chapter allows planners to evaluate the utility's methodology using criteria established by several nationwide studies, criteria such as replicability, quantification of data and involvement of the public.

Chapter 4: Cooling Systems

Most power plants use massive amounts of water for cooling. The discharge of heated cooling water can have significant environmental impacts on plant and animal life sensitive to increases in temperature. In addition, the water discharged from a power plant's cooling system contains a variety of pollutants that can adversely affect water quality.

Chapter 4 explains the technology of cooling systems, including once-through cooling, cooling towers and cooling ponds. The types of cooling systems used in coal-fired power plants in Florida are described, along with the amount of water required for each type. Florida regulations governing the temperature of water discharged are summarized.

This chapter also describes environmental impacts resulting from the use of water by power plants. These include thermal pollution, salt drift from cooling towers, the discharge of chlorine, water quality deterioration from cooling tower "blowdown" and the mortality caused to aquatic organisms by being drawn into the cooling system of a power plant, a problem called "impingement and entrainment."

Chapter 5: Air Pollution

Because the issue of air quality deterioration from a proposed power plant is likely to considerable prominent public attention, this chapter goes into considerable detail on the nature of air pollution from coal-fired power plants and on methods to reduce emissions.

Chapter 5 examines the sources and amounts of the three major types of pollutants emitted from coal combustion in Florida: sulfur dioxide, nitrogen oxides, and particulates. The anticipated health effects of each pollutant are summarized, as are the effects of acid rain, the greenhouse effect, and the effects of radioactive emissions from coal plants. This chapter summarizes the air quality regulations issued by both Florida and the U. S. government.

Methods of air pollution control used by coal-fired power plants in Florida are described, and basic information on technologies such as flue gas desulfurization, scrubbers and electrostatic precipitators is presented. For each of these technologies, the cost of achieving the degree of air quality control required currently in Florida is shown, as is the projected cost of achieving more stringent standards than are currently required.

Chapter 6: Water Pollution from Waste and Coal Storage

A coal-fired power plant produces tons of solid wastes every day, including boiler ash and by-products from flue gas desulfurization. Rain water seeping through stored wastes and coal storage areas picks up numerous chemicals that can have a serious impact on water quality.

Chapter 6 shows the amounts and types of solid wastes produced by three coal-fired power plants in Florida. Potential impacts on plant and animal life are reviewed, and key terms such as leachate, permeability, berms, fly ash and liners are explained.

Methods to reduce water pollution from stored solids are discussed; these include building dikes and storage ponds, as well as selling or compacting the wastes. The cost of each of these techniques is also presented. Florida water quality standards are summarized.

Chapter 7: Other Impacts

In addition to environmental impacts, the construction of power plants carries with it a number of other impacts: transportation impacts, noise impacts and socio-economic impacts.

a. Transportation Impacts--This section projects the amount of coal that would be expected in Florida if the growth in coal-fired capacity described in Chapter 1 were to take place. In addition, the section identifies the probable impacts that the expected great increase in coal delivery would have on major transportation modes: rail, barge and coal-slurry pipeline.

The construction of a power plant generates considerable load road traffic and may necessitate additional traffic controls or road capacity improvements. The handbook shows traffic estimates made by utilities in two site applications and discusses one study which compared traffic projections in the application with actual traffic conditions that occurred at the construction site.

b. Socio-Economic Impacts--A power plant construction project, which may cost $1-2 billion, can have a major impact on employment, housing and wages in a rural community. And the property taxes generated by an investor-owned power plant can generate millions of dollars a year in property taxes.

For this reason, all power plant site applications in Florida contain the results of computer models which seek to project these impacts. The socio-economic impacts forecast in three recent applications are summarized, and the conclusions of a major nationwide study that evaluated a number of these models is highlighted. The results of one study in Florida that compared projected socio-economic impacts with actual impacts as experienced are also discussed.

c. Noise Impacts--The noise generated by a power plant can be heard clearly for more than a mile and could be a serious disturbance for anyone living too close to the plant. Background information on noise levels and noise standards is presented, and the projected noise levels of two Florida power plants as given in the site certification application are compared with these noise level standards.

Chapter 8: Alternatives to New Construction

The central question in the PSC Need for Power Determination process is how the electric energy needs of the state can be provided at the least cost and with an acceptable level of reliability. For this reason, Chapter 8 explains how planners can compare the cost of new coal-fired construction with the projected cost of alternatives such as conservation and renewable energy measures. This will enable a consideration of the extent to which these measures can or cannot economically offset the need for new coal-fired capacity.

This chapter reviews current efforts to promote conservation through FEECA (the Florida Energy Efficiency and Conservation Act) and shows recent changes in the PSC Determination of Need regulations that reflect the FEECA legislation. In addition, Chapter 8 summarizes two major studies that have evaluated the ability of conservation and renewable resources to offset the need for new capacity in Florida, and presents the position of the utility industry on this subject.

In addition to conservation options, Chapter 8 examines the feasibility of generating alternatives other than new coal-fired capacity. These options include: cogeneration, nuclear power, natural gas, conversion of oil-fired units to coal, use of municipal wastes for power generation, importation of power from other states and ocean thermal energy conversion.

PART III

TRANSMISSION LINE SITING
(Chapters 9 and 10)

Chapter 9: Transmission Line Siting in Florida

The certification of transmission lines in Florida is governed primarily by the Transmission Line Siting Act (TLSA). Chapter 9 summarizes the major provisions of the TLSA; a copy of the act is included as Attachment III. A list of applications received under the TLSA is provided, and key terms such as a transmission line "corridor" are explained.

Each step in the transmission line siting process is explained:

1. The PSC Determination of Need process
2. The initial review by DER
3. The Certification Review by state- and local-government agencies
4. The Certification Hearing
5. The Recommended Order of the Division of Administrative Hearings;
6. The Order of the Siting Board (the Governor and Cabinet
7. Post-Certification Review by DER.

The responsibilities of each state and local government agency becoming involved in transmission line siting are summarized. Other federal and state laws applying to transmission line siting are briefly described. A directory of agencies involved in transmission line siting is included as Attachment IX.

Chapter 10: Transmission Line Impacts

As utilities have begun to build transmission lines of higher and higher voltages, concern has arisen about the possibility of health dangers stemming from electro-magnetic fields surrounding power lines. Therefore, Chapter 10 examines some of the research findings on this subject conducted by other states and the utility industry.

In addition to operational impacts, Chapter 10 briefly reviews construction and land use impacts. These include the impact on water flow resulting from the construction of access roads, the impact on wildlife from clearing trees for a new transmission line and the impact on land values of adjoining land.

To help planners deal with this subject, the chapter defines engineering terms such as kilovolts per meter and extra-high voltage. A short description of transmission line towers and a map showing the extent of 500 kilovolt lines in Florida are also provided.

BIBLIOGRAPHICAL REFERENCES

The literature on the subject of power plants and transmission lines is immense: No one-volume handbook could possibly do justice to the issues involved. For this reason, the handbook attempts only to provide a brief introduction to the key issues, and to direct the reader to bibliographical references which should be consulted on specific points. Wherever possible, interlibrary loan locations and NTIS numbers have been provided to allow planners to obtain technical publications with relative ease.

Because there are a number of standard references on the siting of power plants and transmission lines, this handbook has been designed to complement these sources with information specifically dealing with Florida. Since these publications are so easily available and are so useful, this handbook does not attempt to duplicate the material contained in those publications.

When dealing with a power plant or transmission line siting question, a planner would benefit from first consulting several of the standard works in this field; some of these are listed in the bibliography below.

A. BIBLIOGRPAHICAL SOURCES

National Technical Information Service. Power Plant Siting. (Springfield, VA: NTIS., Feb., 1983). Vol. 1: 1966-1974; Vol. 2: 1978-1982). NTIS Nr. PB83-805663

U. S. Dept. of Energy. Energy Abstracts for Policy Analysis (Washington, D. C.: Government Printing Office).

This is the single best source for information on energy planning, including power plants and transmission lines. The Abstracts appear monthly, but there is an annual index.d

Electric Power Research Institute. EPRI Guide. (Palo Alto, CA: EPRI, twice yearly).

EPRI is the research arm of the electric utility industry. The EPRI Guide provides an index to the thousands of research studies on electric power plants and transmission lines which have been conducted by EPRI.

B. GENERAL REFERENCES

Berkshire County Regional Planning Commission. Evaluation of Power Facilities: A Reviewer's Handbook. (Pittsfield, MA: Berkshire County RPC, April, 1974). Available ILL: FSU Call Nr. DOC HD 9685 U5.

This publication provides a good introduction to the general subject of power plant and transmission line siting. Because it was published in 1974, it is now somewhat out of date, particularly with regard to environmental regulations, but it is still recommended.

California Energy Commission. Constraints and Opportunities for Power Plant Siting. (Sacramento, CA: Calif. Energy Cmmsn, Nov., 1979.)

An overview of the entire area of power plant siting. Although the report specifically addresses California issues, much of the material pertains equally well to other states, including Florida.

Green, Alex E. S. (ed.) The Impact of Increased Coal Use in Florida. (Gainesville, FL: Univ. of Florida, 1980). 2 vols.

This study, prepared for the Governor's Energy Office, is the most ambitious investigation of the impacts of coal-fired power plants in Florida. However, some of the information is now out of date, and many of the topics are of limited value to planners. This study was never published, and is available only from the Board of Regents.

A more general publication based on this research, also edited by Green, is Coal Burning Issues, published by the University of Florida Press. This is book is of value to planners, but it is not specifically related to Florida.

Rogers, John et al. Environmental Assessment Handbook. Executive Summary of the Maryland Major Facilities Study. (Annapolis, MD: Maryland Dept. of Natural Resources, Energy and Coastal Zone Administration, December, 1977). NTIS PB-296-821

The six-volume Maryland power study, funded, in part, by the federal government, serves as an good model for other states. The Executive Summary is a concise guide to power plant siting issues that could prove quite helpful to planners; other volumes of the study dealing with specific environmental and socio-economic issues are listed elsewhere. (See also the 1982 Maryland study listed below.)

Shannon, Robert. Handbook of Coal-Based Electric Power Generation: The Technology, Utility Application and Economics of Coal for Generating Electric Power. (Park Ridge, NJ: Noyes Publications, 1982). Available ILL: Univ. of Florida Call Nr. TK 105/S34 1982.

This is a valuable one-volume compilation of technical information on coal-fired power plants, including cooling, coal use, air pollution abatement measures, costs and so forth. It is compiled from a number of government reports.

Winter, John and Conner, David. Power Plant Siting. (New York: Van Nostrand, 1978).

Although this study by Winter and Conner focuses on Ohio, it has considerable application elsewhere. While some of the sections, especially material relating to environmental regulations, are now out of date, it still has considerable merit as an introduction to the basic issues of power plant siting.

Maryland Department of Natural Resources. Power Plant Cumulative Environmental Impact Report. (Annapolis, MD: Maryland Dept. of Natural Resources, Power Plant Siting Program, February, 1982).

This is the single most valuable one-volume study of power plant siting. It is up-to-date, well-researched, and comprehensive.

CHAPTER 1

SYSTEMS PLANNING

CHAPTER 1

SYSTEMS PLANNING

This chapter is provides provide an introduction to the power generation projections being made by the state's electric utilities and to the technical features of electric power generation from coal. This material will be of particular interest to planners who want to understand or to take part in the "Need for Power Determination" proceedings of the state's Public Service Commission.

Part A of this chapter summarizes these utility projections and identifies the locations of current and proposed coal-fired power plants. A brief description of the size, type and costs of coal-fired power plants in Florida is given in Part B. Impacts this level of growth would have on capital costs and the reliability of power are discussed in Part C.

A. COAL IN FLORIDA'S FUTURE

1. Coal Use Projections

The Arab oil embargo of 1973-74 emphasized the nation's serious vulnerability caused by its reliance on imported petroleum. The federal government's determination to reduce U.S. dependence on imported oil and the staggering oil price increases which occurred both in 1974 and again in 1979, during the Iranian revolution, have led to coal's emergence as the fuel of choice for new power plants.

According to the U. S. Department of Energy (DOE), coal consumption by electric utilities nationwide almost doubled from 1965 to 1978, from 245 million tons per year in 1965 to 481 million tons in 1978. DOE projects that by 1995 coal consumption by electric utilities will have grown to almost 1.2 billion tons per year, 143 percent above the 1978 level.

In keeping with the projected increase in coal use nationwide, coal is rapidly becoming the dominant fuel for electric power generation in Florida. As seen in Fig. I-1, by the end of 1983 there were 20 coal-burning power plant boilers in Florida, accounting for 6,274.5 megawatts (MW) of capacity; by 1991 the number of coal-burning power plants is forecast by the Florida Electric Coordinating Group (FCG) in its 1983 Ten-Year Plan to have grown to 33 units. The FCG predicts that by 1991 the total statewide coal capacity of Florida will be 13,140 MW, more than twice the amount on-line in late 1983.

By using projections of the Florida Public Service Commission (PSC) and the FCG, it can be extrapolated that by the year 2001 there could be approximately 26,500 MW of coal-fired capacity in this state. This would be more than double the 1991 amount and 322 percent above 1983.*

Reflecting this unprecedented rise in coal-burning capacity, the FCG forecasts that electricity produced from coal will increase from 21,874 gigawatt-hours (GWH) in 1981 to 60,966 GWH in 1991 and 137,706 GWH in 2001, a 437 percent increase 1981-2001. (See Fig. I-2) (A "gigawatt-hour" is a million kilowatt-hours, or a thousand megawatt-hours.)

As a result of this sharp increase in coal use, the percentage of electricity produced from coal is projected to rise dramatically. As seen in Fig. I-3, coal only constituted 17 percent of all electric power production in Florida in 1974, but the FCG projects that coal will account for 41 percent of statewide power production by 1991 and 68 percent by 2001. Conversely, oil is projected to plummet from 58 percent of electric production in 1976 to 21 percent in 1991 and 15 percent in 2001.

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*Using FCG projections for Peninsular Florida plus the share of Gulf Power generated in Florida, in 1982 the PSC projected 137,706 GWH from coal by 2001. The figure of 26,500 MW assumes a capacity factor of 59 percent or 5168.4 GWH per net MW.

Fig. I-1. Coal-Fired Electric Generation Capacity in Florida, 1961-2001. Source: PSC (1983) and FCG (1982 and 1983).

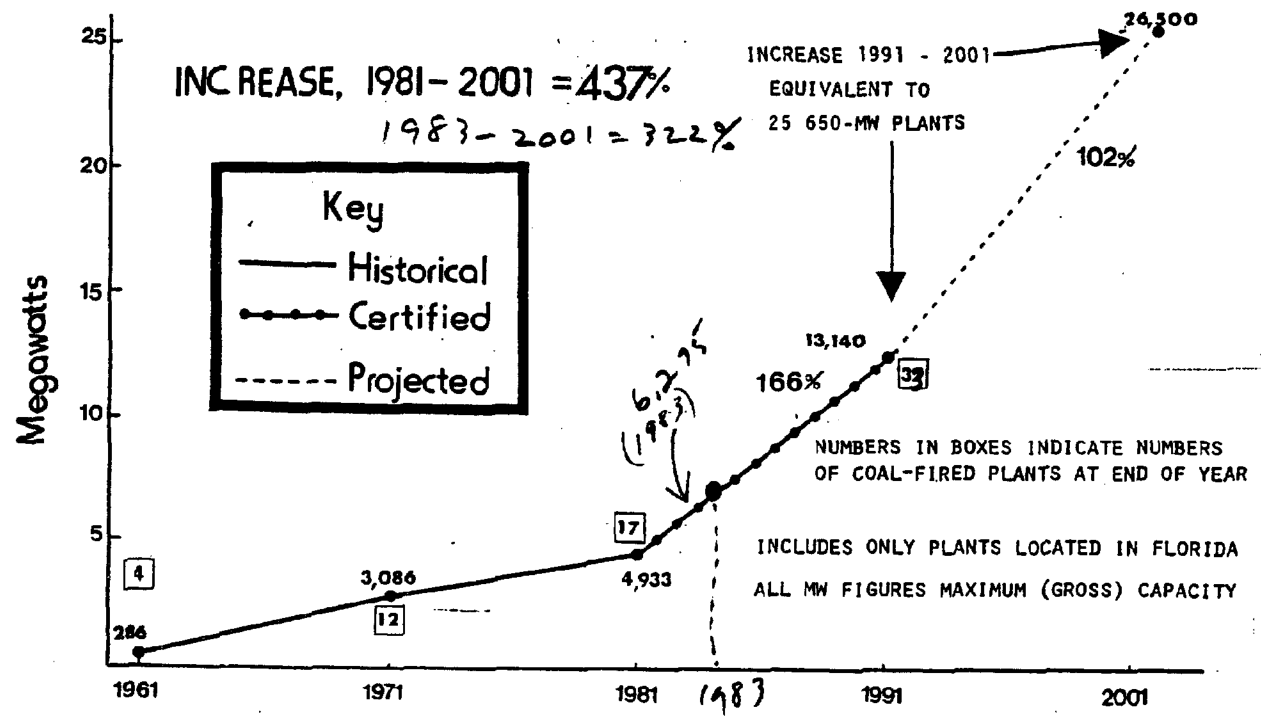
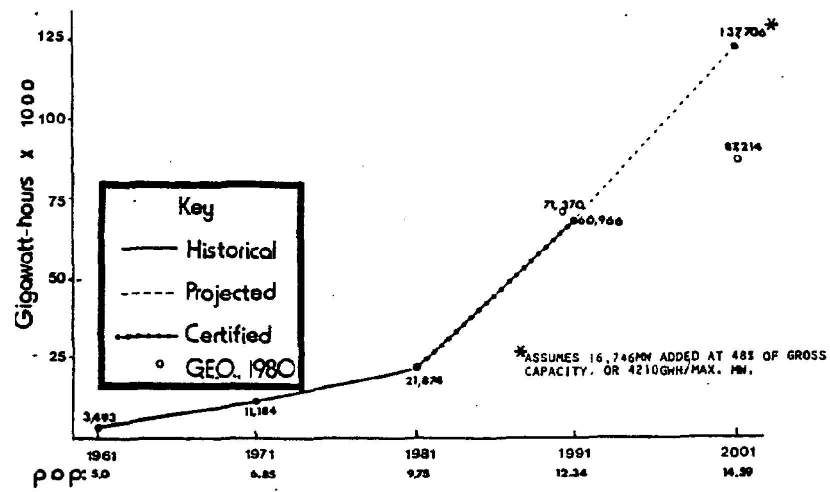


Fig. I-2. Electric Power from Coal-Fired Power Plants in Florida. Source: Florida PSC (1982 and 1983).



These projections for coal reflect the overall increase in demand for electric power which the utilities of Florida are forecasting. According to the forecast of the Public Service Commission made in December of 1983, Florida's peak summer demand will rise from 19,649 MW in 1982, to 29,556 MW in the year 2003, an increase of 50 percent in 21 years.

To meet this forecasted demand, the Florida Electric Coordinating Group (FCG) projects the need for some 18,700 MW of new power plant capacity between 1982 and 2001 in "Peninsular Florida" (i.e., all of Florida except for the Gulf Power Corp service district in West Florida). As seen in Table X-1, in 1983 the FCG projected that installed power plant capacity in Peninsular Florida would rise from 28,114 MW in 1983 to 41,914 MW in 2001, a growth of 13,800 MW. This represents an increase of 49 percent in 20 years. Almost all of this tremendous increase is projected to come from construction of coal-fired capacity.

Although these projections are the standard planning assumptions of both the utilities and the state's Public Service Commission (PSC), they are open to considerable uncertainty. As seen in Fig. I-4, projections of electricity consumption made in previous years by the FCG have tended to be substantially higher than actual consumption. Projections for 1980 consumption made in 1972, for example, before the Arab oil embargo and the concomitant leap in oil prices, were 48 percent higher than was the actual case. Similarly, projections made in 1977 for 1986 are 15 percent higher than forecasts made five years later for the same target years.

These projections must also be seen in the light of a general nationwide trend to greater reliance on domestically mined coal, and as an outgrowth of the stated policy of the PSC to reduce oil to less than 25 percent of the state's fuel for electric power generation. Because oil supplied over half of Florida's electric generation during the 1970s, the PSC has taken the position, consistent with federal policy of the 1970s, that this overdependence on oil leaves the state vulnerable to foreign supply disruptions and precipitous price increases.

It is because of this enormous increase in coal use projected for Florida that this handbook deals almost exclusively with issues surrounding the siting of new coal-fired power plants.

Fig. I-3. Production of Electric Power by Fuel in Florida. Source: Florida PSC.

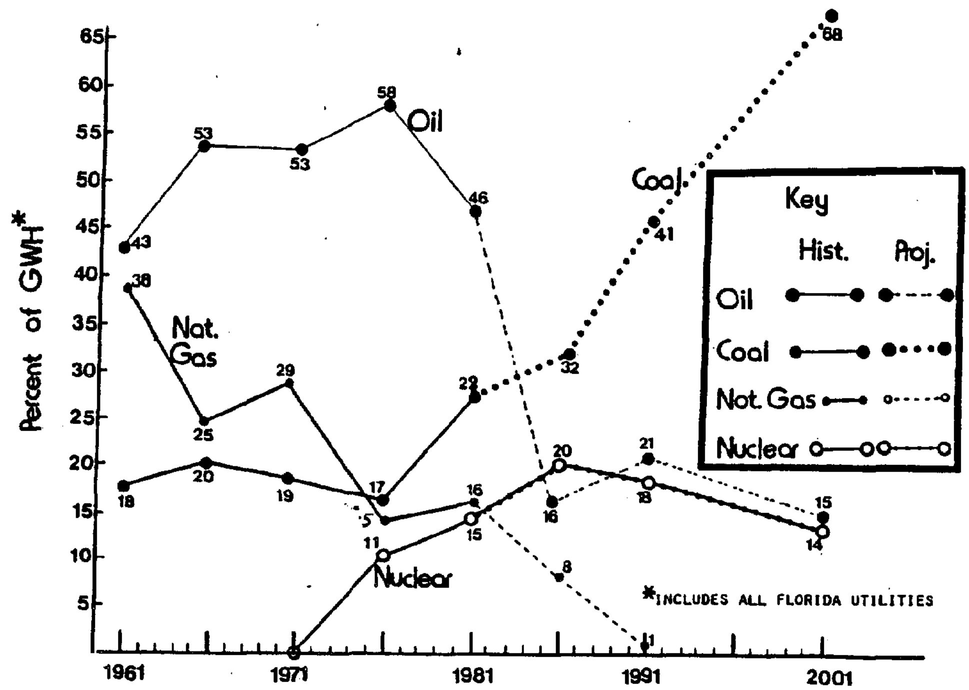
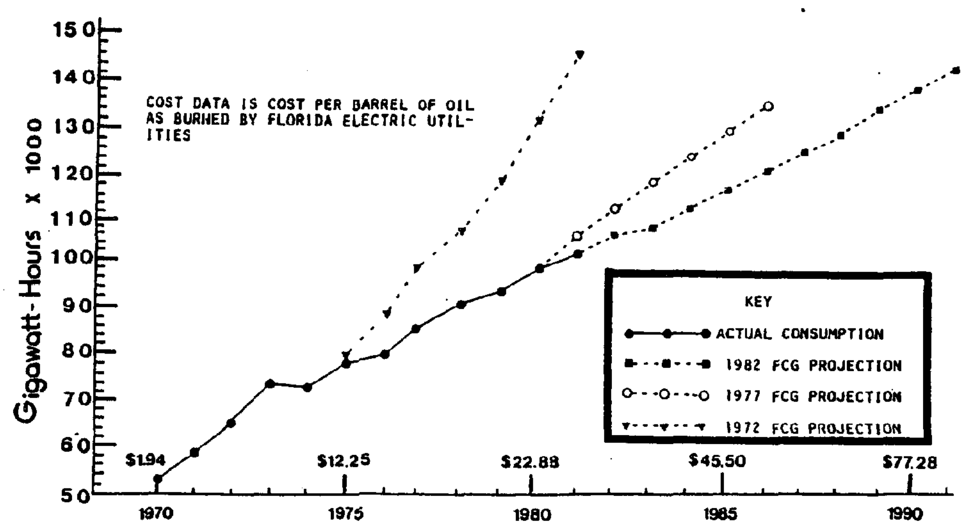


Fig. I-4. Projections of Electricity Consumption in Florida Made in 1972, 1977 and 1982 by the Florida Electric Coordinating Group. Source: FCG Ten-Year Plans.



2. Electric Utilities of Florida

a. Utility Service Districts--In Florida, there are over 30 electric utilities; the nine-largest are listed in Table I-1. These can be classified as (1) investor-owned utilities (IOUs); (2) municipal utilities (MUNs); and (3) cooperatives (COOPs). Seminole Electric Cooperative (SECI) is a consortium of eleven municipal cooperatives. See the map of service areas, Fig. I-5.

b. Definition of Terms--In considering the characteristics of power plants, it is important for planners to bear in mind that power plants are rated in terms of megawatts (MW). A watt is a unit of power, or rate of doing work; a megawatt is one million watts. It is analogous to horsepower: one horsepower is equal to 746 watts (.746 kilowatts). A typical new power plant is often about 600 MW.*

A "megawatt-hour" (MWH) is one megawatt supplied for a period of one hour. This is a unit of energy; if a 600 MW plant were to operate at 100 percent capacity for one hour, it would generate 600 megawatt-hours. Assuming 10,000 Btu per kilowatt-hour (10 million Btu per MWH), the plant would require a heat input of 6 billion Btu per hour.

However, in actual practice a power plant may operate at only 50 percent capacity, and may be built to operate only with a maximum "capacity factor" of 70 percent. Therefore, at a 70 percent capacity factor, a 600 MW unit would require 4.2 billion Btu during one hour. Assuming the plant burns coal rated at 10,500 Btu per pound (21 million Btu per ton), this would be equal to 200 tons per hour, 1.75 million tons per yr.

The distinction between gross (or maximum) megawatt rating and summer (or net) MW rating must also be kept in mind. The "gross MW" rating is the capacity of the boiler to do work; the "peak MW" rating is the actual peak output of the plant. Because devices such as flue gas desulfurization (FGD) units and electrostatic precipitators (ESP) require power to operate, the plant's net output will be less than the gross rating. In a typical new 600 (gross) MW plant, the summer (or net) MW output may be about 516 MW, 14 percent less than the gross MW figure.

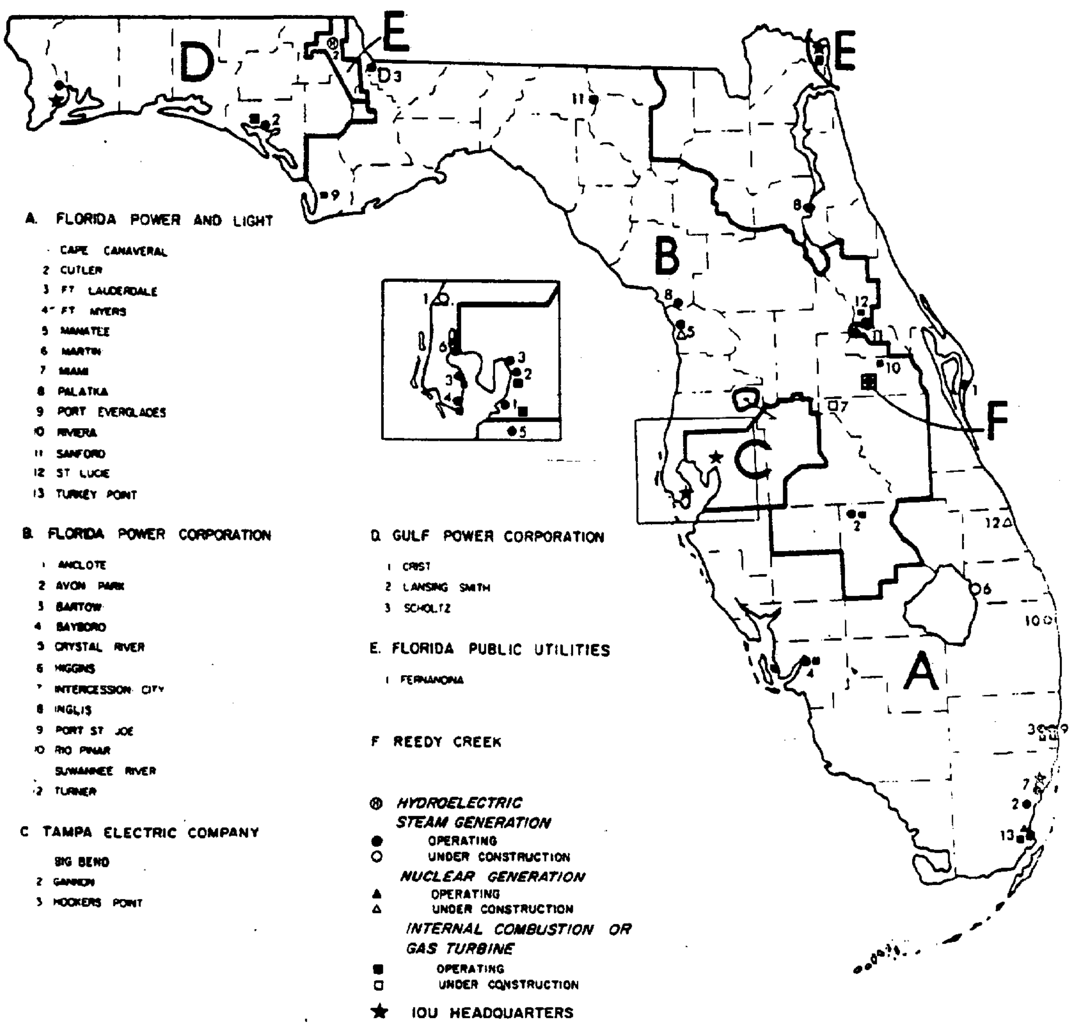
*For definitions of terms, see the Glossary, Attachment VI.

Table I-1. Total Consumption, 1982, for the Nine-Largest Electric Utilities in Florida. Source: Florida Public Service Commission (1983).

Utility		Consumption 1982 (MWH x 1000)	Pct. of State
Florida Power and Light (FPL)	IOU	43,790	47.2
Florida Power Corp (FPC)	IOU	15,131	16.3
Tampa Elect. Co. (TECO)	IOU	10,038	10.8
Jacksonville Elect. Author. (JEA)	MUN	5,305	5.7
Seminole Electric Coop, Inc (SECI)	COOP	5,171	5.6
Gulf Power Corp. (GPC)	IOU	5,243	5.7
Orlando Utilities Commission (OUC)	MUN	2,244	2.4
City of Lakeland (LAK)	MUN	1,204	1.3
City of Talla - hassee (TAL)	MUN	1,339	1.4
TOTAL, Nine-Largest		89,465	
TOTAL, Entire State		92,720	
PERCENT, Nine-Largest		96.5%	

IOU = Investor-owned utility
MUN = Muncipal utility
COOP = Cooperative

Fig. I-5: Service Districts of Florida's Investor-Owned Electric Utilities. Source: Florida PSC.



3. Coal in Florida: 1983 - 2000

a. Coal in Florida 1983--Compared to the nation as a whole, coal consumption in Florida in 1983 was relatively low. As seen in Fig. I-6 and Table I-2, in that year there were 20 coal-fired boilers in Florida and only three large coal-fired plants: the Crystal River plant of Florida Power Corp. (FPC) in Citrus County, the Big Bend plant of Tampa Electric Co. (TECO) in Hillsborough County, and the Crist plant of Gulf Power Corp. (GPC) in Escambia County. In addition to these three sites, there were units located in the counties of Alachua, Putnam, Hillsborough, Bay, Polk, and Jackson.

b. Plants Under Construction--During the decade of the 1980s, the construction of coal-fired units will make coal use far more common throughout the state. In 1984 two large units are scheduled for completion in Hillsborough County (TECO's Big Bend 4) and Citrus County (FPC's Crystal River 5). In 1985 SECI's second Seminole plant is scheduled for completion, and in 1986 Stanton 1 of the Orlando Utilities Commission (OUC) is to be finished. (See Fig. I-7 and Table I-2.)

In 1987 the first of two units of the St. Johns River Power Park, located in Duval County, owned jointly by Jacksonville Electric Authority (JEA) and Florida Power and Light (FPL) is to go on-line, and the second is scheduled for 1988. SECI has announced plans to construct two units in Taylor County near Perry , bringing them on-line in 1988 and 1989. This plant, however, has not yet been certified, and it is uncertain if these plants will be built as originally announced.

c. Possible Future Additions--If the electric utilities of the state apply for an additional 13,500 MW of new coal-fired capacity to go on-line in the 1990s, as is currently being forecasted, this could mean adding the equivalent of up to 21 650-MW units during the 1990s. Not all of this amount would be new capacity, since some it may come from conversion of currently operated oil-fired boilers to coal or coal-water mixture, but a large percentage of this amount would most assuredly be new construction.

Table I-2: Additions to Florida's Coal-Fired Electric Generating Capacity, 1953-2001.

NR.	DATE	POWER PLANT	UTILITY	CAPACITY (MW)	COUNTY
I. ADDITIONS PRIOR TO 1962					
1&2	1953	Scholz 1 & 2	GPC	98.00	Jackson
3	1959	Crist 4	GPC	93.75	Escambia
4	1961	Crist 5	GPC	93.75	Escambia
	SUBTOTAL as of 12/31/61			285.50	
II. ADDITIONS, 1962 - 1971					
5	1965	Gannon 5	TECO	239.40	Hillsborough
6	1965	Smith 1	GPC	149.60	Bay
7	1966	Crystal River 1	FPC	440.50	Citrus
8	1967	Smith 2	GPC	190.40	Bay
9	1967	Gannon 6	TECO	414.00	Hillsborough
10	1969	Crystal River 2	FPC	523.80	Citrus
11	1970	Crist 6	GPC	396.75	Escambia
12	1970	Big Bend 1	TECO	445.50	Hillsborough
ADDITIONS, 1962 - 1971				2,799.95	
CUMULATIVE, as of 12/31/71				3,085.45	
III. ADDITIONS, 1972 - 1983					
13	1973	Big Bend 2	TECO	445.50	Hillsborough
14	1973	Crist 7	GPC	578.00	Escambia
15	1976	Bartow 1 (now C-O-M)	FPC	127.50	Pinellas
16	1976	Big Bend 3	FPC	445.50	Hillsborough
17	1981	Deerhaven 2	GVL	250.75	Alachua
18	1982	McIntosh 3	LAK/OUC	364.00	Polk
19	1982	Crystal River 4	FPC	695.00	Citrus
20	1983-84	Seminole 1	SECI	650.00	Putnam
ADDITIONS, 1972 -1983				3,189.05	
CUM[illegible]ATI[illegible]				6[illegible]4.5[illegible]	

Table I-2 (Cont'd)

NR.	YR	PLANT	UTILITY	MAX (GROSS) MW	COUNTY
IV. EXPECTED ADDITIONS, 1984 - 1988					
21-25	1983-85	Gannon 1-4 (Conversions)	TECO	1270.40	Hillsborough
26	1985	Big Bend 4	TECO	486.00	Hillsborough
27	1984	Crystal River 5	FPC	695.00	Citrus
27-28	1985	Bartow 2-3 (Conversions)	FPC	356.90	Pinellas
29	1985	Seminole 2	SECI	650.00	Putnam
30	1987	Stanton 1	OUC	460.00	Orange
31	1987	St. Johns Riv. Pwr Prk	JEA/FPL	640.00	Duval
32	1988	St. Johns Riv. Pwr Prk	JEA/FPL	640.00	Duval
EXPECTED ADDITIONS, 1984 - 1988				4,925.5	
CUMULATIVE, Projected for 12/31/88				11,200.0	
V. POSSIBLE ADDITIONS, 1988 - 2001					
33	1988 *	Taylor 1	SECI	650.00	Taylor
34	1993 *	Tallahassee	TAL	400.00	Leon
35	1990 *	Taylor 2	SECI	650.00	Taylor
36	1992 *	McInnes 1	TECO	450.00	Hillsborough
37	1993 *	Martin 3	FPL	700.00	Martin
38	1994 *	Martin 4	FPL	700.00	Martin
39	1994 *	Stanton 2	OUC	425.00	Orange
40	199? *	Desoto Site	FPL	?	Desoto
41	199? *	Dade County Site	FPL	?	Dade
42	199? *	McInnes 2	TECO	450.00	Hillsborough
43	199? *	Gulf County Site	FPC	?	Gulf
44	199? *	Caryville	GPC	?	Washington
POSSIBLE ADDITIONS LISTED				4,600.00	
TOTAL POSSIBLE ADDITIONS, 1988 - 2001				13,547.50	
CUMULATIVE, PROJECTED for 12/31/2001				26,500.00	

NUMBER OF 650MW EQUIVALENT PLANTS WHICH MAY BE PROPOSED FOR CERTIFICATION, 1991-2001: 21 (13,547/650).

*A date followed by asterisk indicates that plant not yet certified.
Includes retirements by Gulf Power Corp.

Fig. I-6: Location of Coal-Fired Power Plants in Florida, 1983 With 1981 Coal Consumption and Coal Supply Method. Source: PSC, FCG.

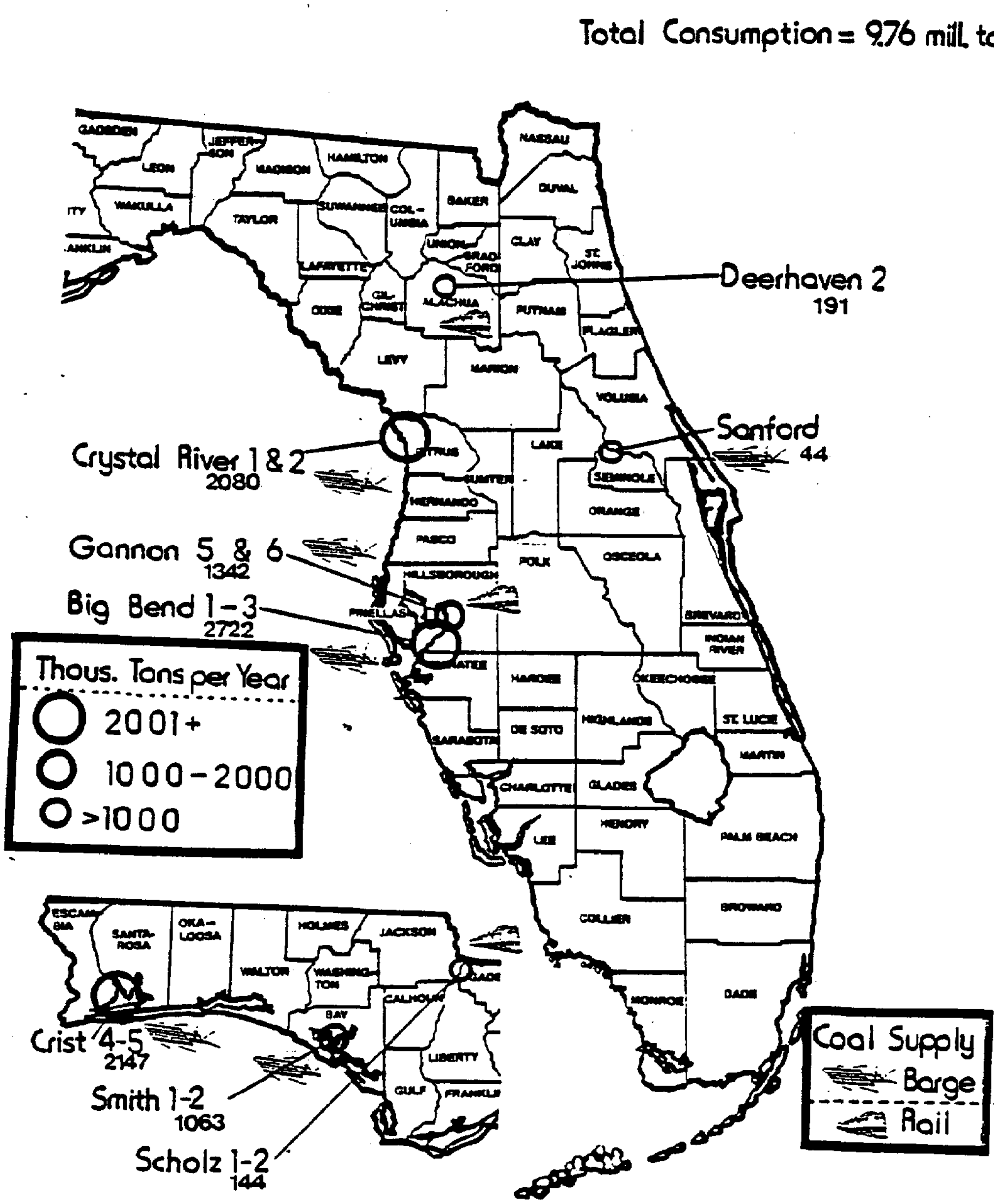
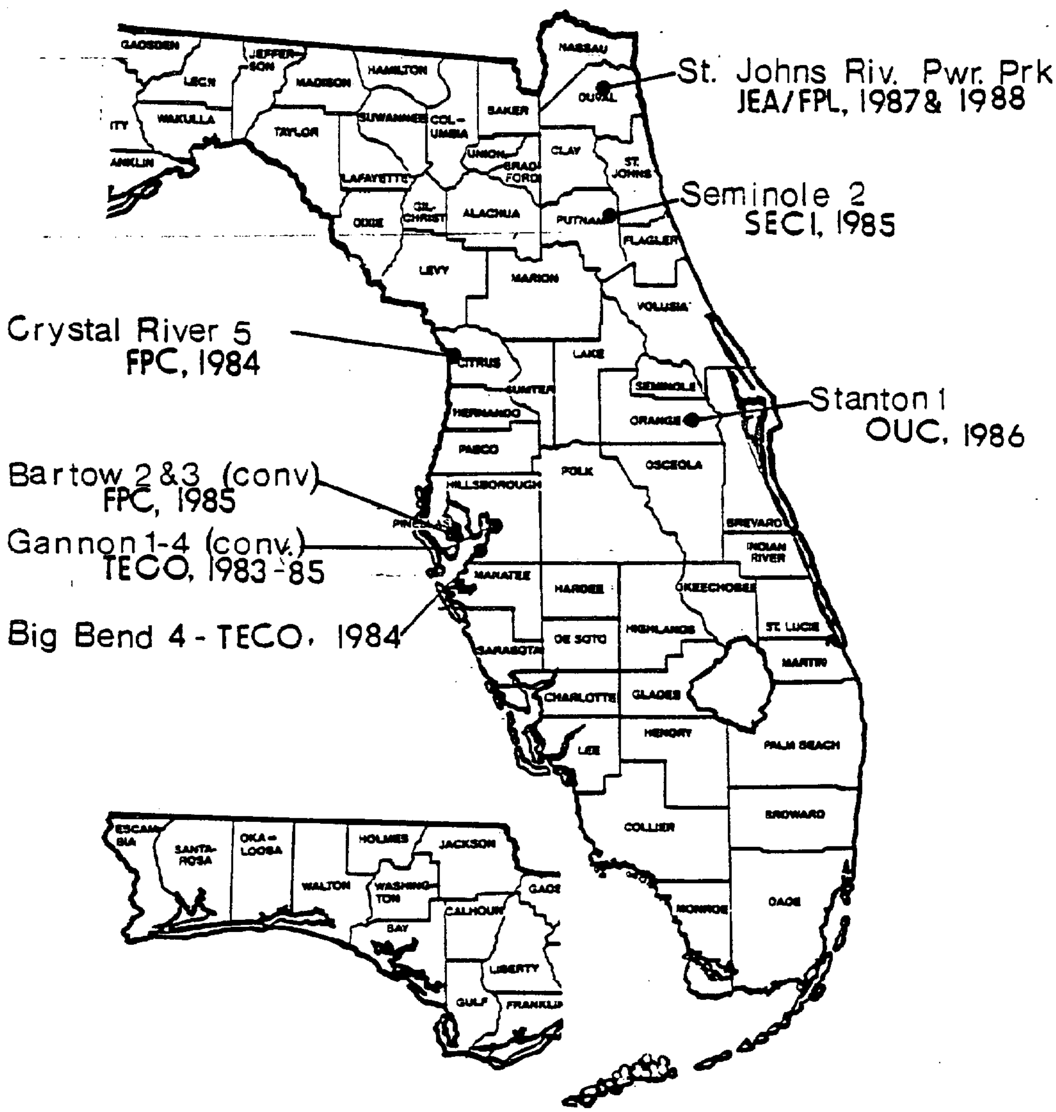


Fig. I-7: Coal-Fired Power Plants Coming On-Line in Florida, 1984-1991. Source: PSC, FCG.



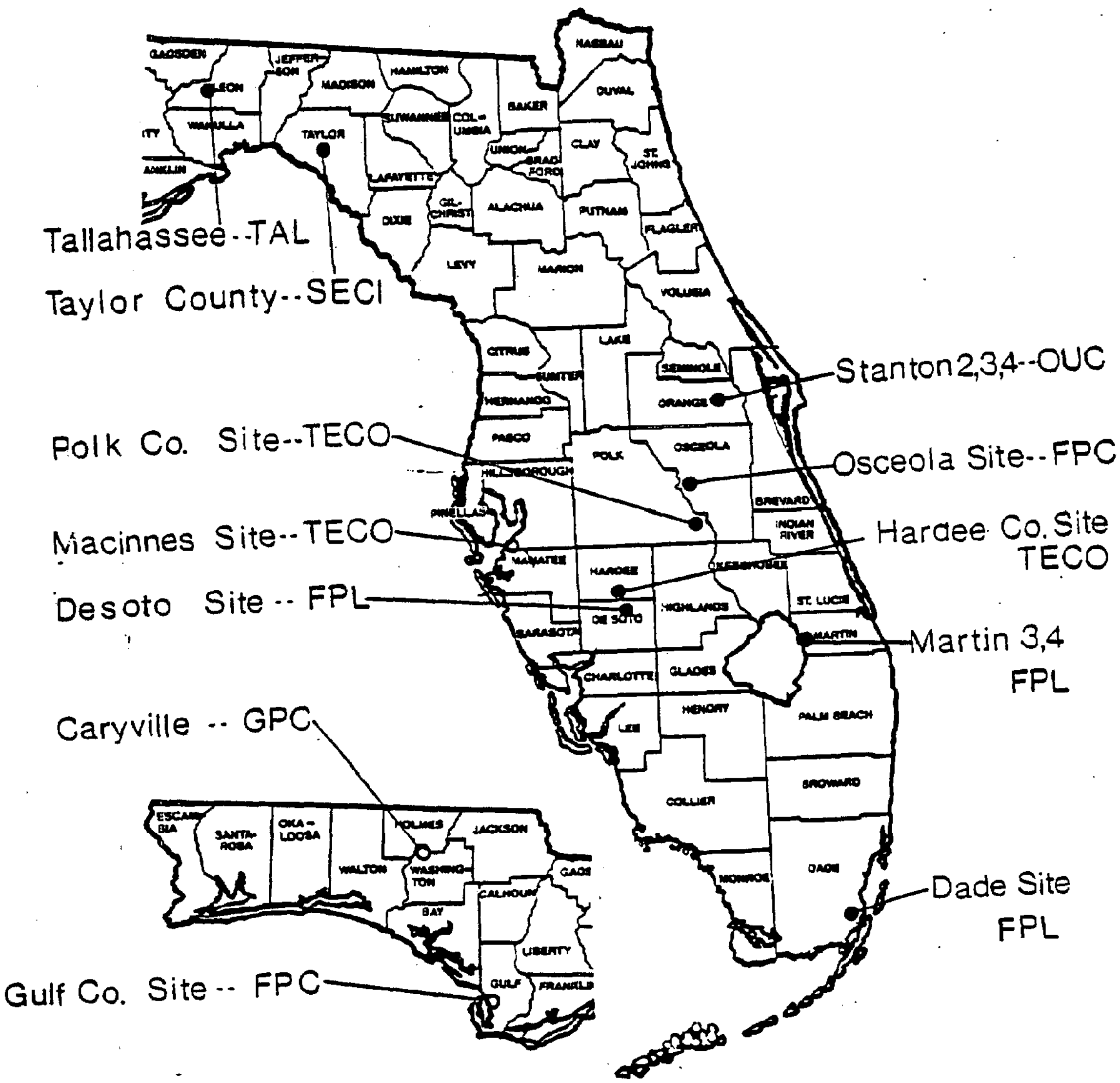
Predicting where this new construction would take place, however, is difficult, because construction plans for this time period are highly speculative. Despite these caveats, using information provided in the Ten-Year Site Plans of the largest electric utilities of the state, certain tentative conclusions can be drawn about possible future locations. (See Fig. I-8 and Table I-2.)

In south Florida , Florida Power and Light, in its 1983 Ten-Year Site Plan, mentions the possibility of applying for coal-fired units at a site in south Dade County just west of the present Turkey point site and also continues to speak favorably of a site not far from the town of Arcadia in Desoto County, near the Peace River. FPL has expressed the intention of constructing two additional coal-fired units at the Martin site in western Martin County to be completed in 1993 and 1994. If these units are built, they may each have a gross (maximum) megawatt rating of 700 MW, making them the largest coal-fired boilers in the state.

In central Florida, Tampa Electric Co. has indicated an interest in constructing a total of four units at the McInnes site in southern Hillsborough County directly on Tampa Bay, for a total of 3200 MW. Although this site is not listed in TECO's 1984 TYSP, it appeared in the 1983 edition, and the utility has filed a Notice of Intent for submit a formal application for the site. The Orlando Utilities Commission has indicated that it intends to add three additional units to its Stanton plant, bringing the total capacity of that site to 1275 MW.

Among sites in northwest Florida, Florida Power Corp. has mentioned the possibility of construction in Gulf County, and Gulf Power Corp. has discussed reactivation of a site near Caryville in Washington County along the Choctawhatchee River. The Caryville site received certification in the early 1970s, but construction was postponed when the utility decided to purchase portions of plants located in Georgia and Mississippi instead. The City of Tallahassee currently is considering a potential 400-MW coal-fired unit in Leon County which would come on-line in 1988. Neither the Gulf County site of FPC nor the Caryville site of GPC is being listed in the 1984 Ten-Year Site Plan of either utility.

Fig. I-8: Potential Sites for Future Coal-Fired Power Plants in Florida As Indicated in Utility Ten-Year Site Plans. Source: TYSPs; PPSAs.



3. <u>Coal Conversion</u>

In addition to construction of new coal-fired capacity, considerable attention has been focused on conversion of oil-fired boilers to coal. As seen in Table I-2, two boilers of Florida Power Corp.'s Bartow plant in Pinellas County are being converted to coal (along with one converted to coal-oil mixture), as are four boilers of TECO's Gannon plant in Hillsborough County.

At the request of the Florida PSC, the U. S. Department of Energy carried out a study of coal conversion suitability among Florida's oil-burning power plants. Suitability in the study was based on four criteria: (1) engineering suitability; (2) economic benefit; (3) environmental suitability; and (4) site suitability. (See Fig. I-9 and Table I-3).

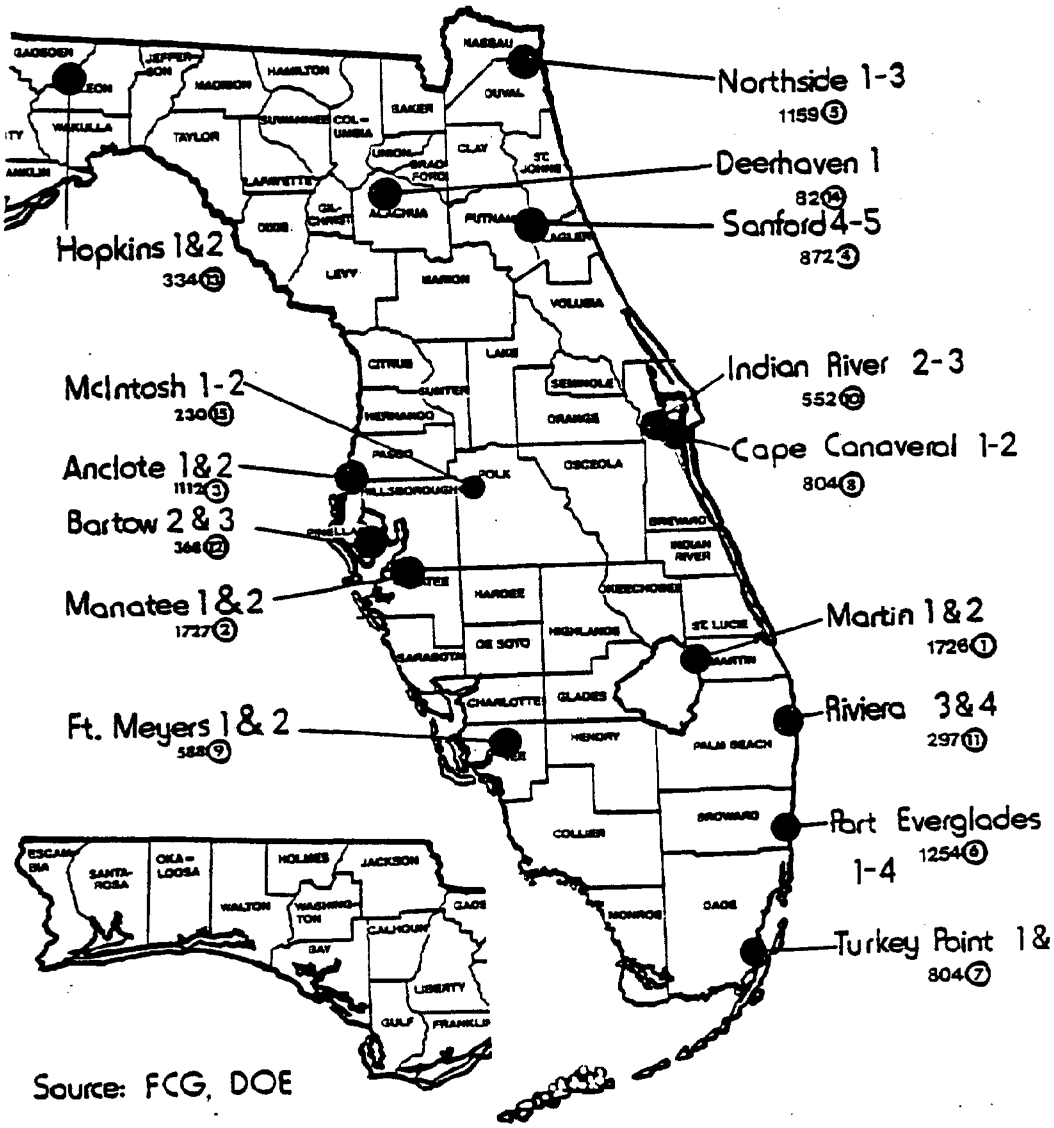
Using these four criteria, the study rates the Martin 1 and 2 units of FPL in Martin County as the highest priority for conversion. The second-highest priority was assigned to FPL's Manatee units 1 and 2 in Manatee County; third highest was FPC's Anclote units 1 and 2 in Pasco County; and fourth highest was Sanford units 4 and 5 at the FPL plant in Volusia County. Other potential coal conversion sites rated by the Dept. of Energy study are shown in Fig. I-8 and Table I-3.

Table I-3. Composite Ranking of 14 Oil-Fired Power Plants in Florida for Possible Conversion to Coal. Source: Conversion of Florida Electric Powerplants from Oil to Coal Burning, U. S. Dept. of Energy, April, 1983.

POWER PLANT	OVERALL RATING	ENGIN-EERING	ENVI-RONMENT	ECON-OMIC	RANK
Anclote (FPC)	F	P	G	P	3
Bartow (FPC)	F	G	F	F	12
Cape Canaveral (FPL)	G	G	G	F	8
Deerhaven (GVL)	G	G	G	G	14
Fort Meyers (FPL)	F	G	G	P	9
Hopkins (TAL)	G	F	G	G	13
Indian River (FPL)	F	F	G	F	10
Manatee (FPL)	G	G	G	G	2
Martin (FPL)	F	G	G	P	1
McIntosh (LAK)	F	F	F	F	15
Northside (JEA)	F	F	F	G	5
Port Everglades (FPL)	F	G	F	F	6
Sanford (FPL)	G	G	G	F	4
Turkey Point (FPL)	F	G	F	F	7

G = good
F = fair
P = poor

Fig. I-9. Potential Sites for Conversion to Coal in Florida. Source: DOE/SAI (1983). Note that numbers in circles refer to priority for conversion assigned in DOE study.



4. Annotated Bibliography

UTILITY POWER PLANT PROJECTIONS

Florida Dept. of Veteran and Community Affairs _An Analysis of the Ten-Year Site Plans of the Electric Utilities of Florida._ (Tallahassee, FL: DVCA, 1981).

Comments on the Ten-Year Site Plans of the state's 10-largest electric utilities.

Florida Electric Coordinating Group. _Ten Year Plan._ (Tampa, FL: Florida Electric Coordinating Group, 1983).

This is the basic reference on electric utility planning in Florida. It is required by law to be revised annually, and provide ten year projections. In recent years, a 20-year planning horizon has been included, in accordance with the Annual Planning Workshop requirement of the state's Public Service Commission.

Florida Public Service Commission. _Statistics of the Florida Electric Utility Industry: 1982._ (Tallahassee, FL: Florida Public Service Commission, Dec., 1983).

This is a compilation of statistics. The series began with publications by the State Energy Office (now known as the Governor's Energy Office); responsibility for publishing this report is now given to the Public Service Commission. This is a "must" in discussing all features of the electric utility industry, including fuel use, pricing, future plans, customer growth, etc.

Ten-Year Site Plans

Each year, each of the state's ten-largest electric utilities submit a ten-year plan which is to include information on sites considered for future plants. More information on this requirement is contained in Chapter2, Part D.

U. S. Dept. of Energy, Energy Information Administration. Annual Report to Congress. Vol III: Forecasts. (Washington, D. C.: Dept. of Energy, 1983). NTIS Nr. DOE/EIA-0173/83/3.
This is the standard nationwide forecast of the Energy Information Administration, an agency of the U. S. Dept. of Energy which is supposed to be independent and autonomous. While it does not emphasize Florida, all Florida statistics such as coal use, conservation, pricing and availability must be seen in the context of the "standard" nationwide figures.

COAL CONVERSION

Shumacher, M. M. Coal-Oil Mixture Combustion Technology. (Park Ridge, NJ: Noyes Data Corp., 1981). 480 pp.
Good standard treatment of burning a mixture of coal and oil.

Shih, C. C. et al. Emissions Assessment of Conventional Stationary Combustion Systems. (Washington, D. C.: U. S. Environmental Protection Agency, 1979). 2 vols.
In considering the issue of conversion to coal, it is necessary to compare the effluent from oilfired boilers with those fired by coal. This study allows that comparison to be done in a generic, not site-specific, fashion.

U. S. Dept. of Energy, Energy Regulatory Administration. Florida Statewide Coal Conversion Study. (Washington, D. C. : Dept. of Energy, Sept. , 1983). 4 vols. NTIS Nr. DOE/RG-0063
Important study, funded by the U. S. Dept. of Energy on request by the Public Service Commission. This study examines the feasibility of converting oil-fired boilers to coal in four categories: environmental, engineering, economics, and site suitability; it recommends conversion of 14 oil-fired boilers in Florida to coal.

Babcock and Wilcox Co. Coal-Water Slurry Evaluation. (Palo Alto, CA: EPRI, Feb., 1984). 3 vols. ERPI Nr. CS-3413.

B. COAL-FIRED POWER PLANTS: SIZE, TYPE, COST AND FUEL SUPPLY

1. Sizes of Units

In 1930, the largest steam-electric unit in the United States was about 200 megawatts (MW), and the average size of all units was 20 MW. Over 95 percent of all units in operation at that time had capacities of 50 MW or less. By 1955, the largest unit size had increased to about 300 megawatts.

Reflecting these national trends, in the years before 1963, the average coal-fired power plant going on-line in Florida was rated at 95.2 MW *. As shown in Table I-2, in the decade 1962-1971, the average size of new units in Florida was 350 MW. The average capacity of coal-fired power plants certified to go on-line for the first time 1984-1988 (not including conversions of oil-fired units) is 550 MW. And the size of coal-fired units may increase even further: Florida Power and Light has indicated an interest in possibly applying for certification of two coal-fired units at its Martin County site which would be 783 MW each.

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*All MW figures used in this chapter are maximum or gross MW rating, unless otherwise indicated.

Capital costs per kilowatt, as well as operation and maintenance costs per unit of energy generated, are less for large units than for small ones. This creates incentives to install larger units. This trend to greater economies of scale is likely to continue until, at some point, the incremental savings may be offset by added physical or operational problems. This point is not expected to be reached, particularly for large utilities or those operating in pools, until sometime after 1990. This is because utility interconnections, as is done in Florida with the Florida electric grid, allow the most efficient use of each plant.

There are factors which tend to limit plant sizes. For example, the amount of land required for a coal-fired plant increases with capacity, principally because of the requirements for coal storage, ash and flue gas desulfurization, sludge disposal, and cooling ponds or towers, if required. The amount of land and water required for large plants will preclude the use of many otherwise desirable plant sites. The land area required for power plants constructed in Florida in recent years is shown in Table I-4. Note that 640 acres is equivalent to one square mile. The vertical height of one typical coal-fired plant--SECI's Seminole 1 unit, located near Palatka, which went on-line in 1983--is shown in Fig. I-10.

Environmental problems tend to be greater for large plants, and local concerns may limit the amount of capacity that will be permitted at any one location. Plant size also affects reliability: If a system is dependent on one or two large units, a breakdown would result in greater consequences in the event of a plant malfunction if the electric grid cannot make up for the entire amount of loss.

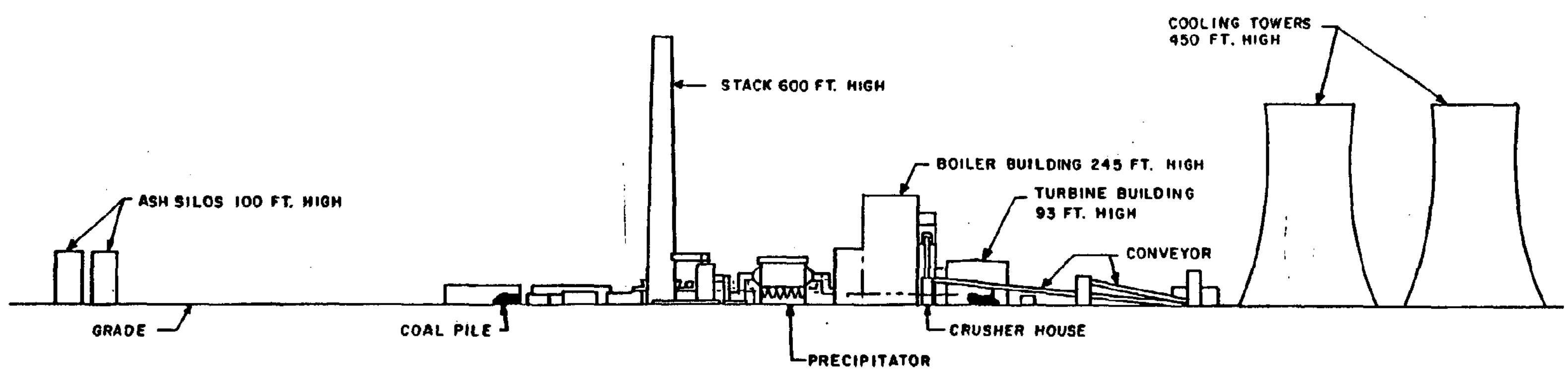
2. Types of Units

In general, there are three kinds of power plant units: (1) base load units, which operate a large percentage of the time and supply most of the power consumed; (2) intermediate load units, which are on-line less often; and (3) less efficient, costly peak load units, which are operated only occasionally to handle peak demand.

Table I-4: Acreage of Major Power Plants in Florida, 1977.

Name		Total Acreage	In Use Acreage
I. Orlando Utilities			
Lake Highland		10	7
Indian River		95	20
II. City of Lakeland			
Larsen		9.3	9.3
McIntosh		414	
III. Seminole Electric			
Putnam County	Approx.	2,000	
IV. Gainesville RUB			
J. R. Kelly		11	11
Deer Haven		1,116	105
V. Florida Power and Light			
Turkey Point		12,750	7,000
Lauderdale		438	190
Port Everglades		93	78
Riviera		22	21
St. Lucie		1,132	300
Cape Canaveral		85	29
Sanford		1,718	1.492
Putnam/Palatka		130	19
Fort Myers		20,533	29
Manatee		9,097	4,150
Cutler		86	32
Martin		10,000	
VI. Tallahassee			
Purdom		42	38
Hopkins		231	35
VII. Gulf Power Co.			
Crist		312	200
Smith		841	270
Scholz		293	168
Ellis		1,934	
VIII. Lake Worth			
Smith		14	7
IX. Tampa Electric			
Gannon		103	103
Hookers Point		26	26
Big Bend		1,079	891
Gas Turbin Big Bend		73	73
X. JEA			
Southside		38	18
Kennedy		25	20
Northside		493	200
XI. Florida Power Corp.			
Anclote		405	376
Avon Park		56	53
Bartow		1,337	1,264
Bay Boro		8	8
Crystal River		4,738	3,608
DeBary		2.209	960
Higgins		117	80
Intercession City		90	90
Port St. Joe		N/A	N/A
Rio Pinar		N/A	N/A
Suwannee River		446	446
Turner		122	122
	Total	54,748	- 1977

Fig. I-10: Seminole Electric Cooperative's Seminole 1 Coal-Fired Power Plant, Palatka, Florida. Source: SECI's Seminole 1 and 2 PPSA (1978).



1. ALL HEIGHTS ARE APPROXIMATE
2. GRADE ELEV. APPROX. 70 FT. ABOVE MSL

Load demands are different for each utility, and vary markedly from day to day and season to season. "Load" is the total electric power delivered or required by a utility system.* Fig. I-11 shows the load demand of eleven representative electric utilities in Florida. Fig. I-12 shows the "loading order" used by the Florida Electric Coordinating Group (FCG) as it operated the Florida electric grid in the winter of 1979-80.

From these illustrations it can be seen how nuclear and coal-fired plants were operated to the largest extent possible as base-load units; when demand reached above about 6000 MW, oil and gas steam units were used; and for peaks above about 14,000 MW costly combustion turbines were placed on-line.

High-pressure, high-temperature, fossil-fueled steam-electric generating units 500 MW and larger are designed as "base load" units and are built for continuous operation at or near full load; these units are not designed for frequent stops and starts and so-called "cycling" or part-time available generation as power demands change.

Base load plants produce power at the lowest cost; however, when units having lower incremental production costs become available for base load operations, older base load units can be adapted and used as "intermediate" or peaking units before they are retired. Fig. I-12 shows how more expensive oil-fired units are frequently used for intermediate loads and combustion turbines, the most expensive of all to operate, are used to meet peak-loads.

Because base-load units are used considerably more often than intermediate- or peak-load units, they have a higher "capacity factor." "Capacity factor" is defined as the degree to which a power plant achieves its maximum possible production. This figure can be computed by dividing the number of megawatt-hours of actual production during a year by the product of the plant's megawatt rating times the number of hours in a year: 8760.

*For definitions, see the Glossary, Attachment VI.

Fig. I-11. Monthly Peak Demand of Eleven Representative Electric utilities in Floida. Source: PSC (1983).

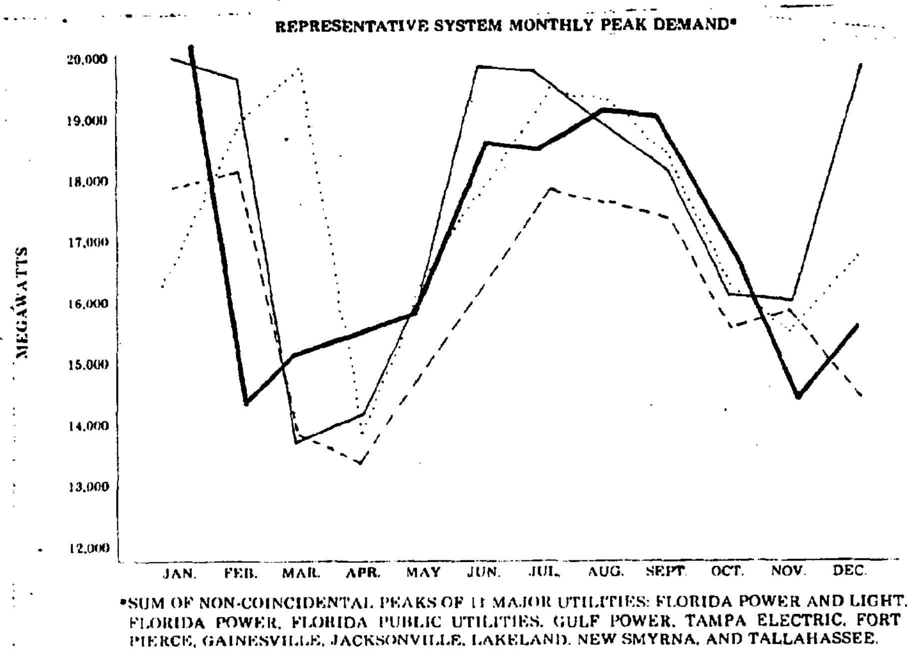
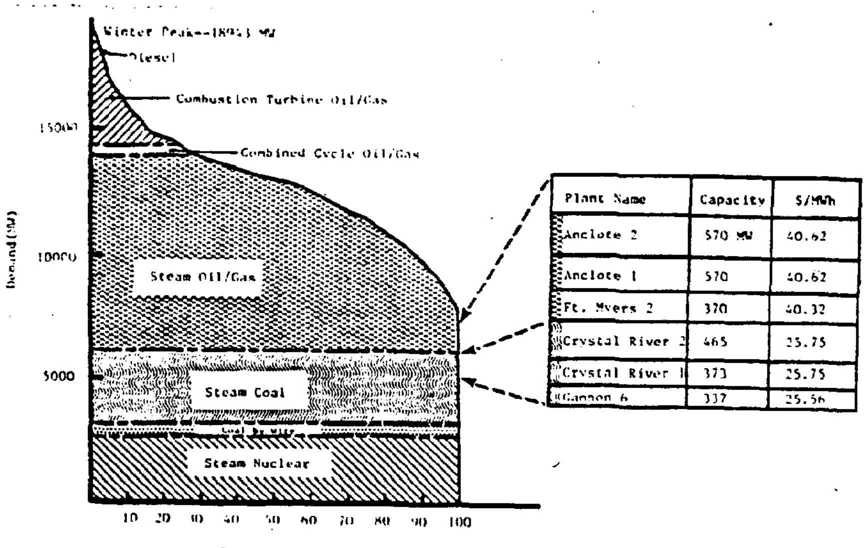


Fig. I-12. Loading Order for Winter 1979-1980 FCG Power Demand. Source: DOE/SAI (1983).



Plant Name	Capacity	$/MWh
Anclote 2	570 MW	40.62
Anclote 1	570	40.62
Ft. Myers 2	370	40.32
Crystal River 2	465	25.75
Crystal River 1	373	25.75
Gannon 6	337	25.56

Table I-5 shows that in Florida during 1980, the average coal plant achieved a capacity factor of 49.9 percent, meaning that the average plant was in operation slightly less than half the time.*. The capacity factor of coal plants in Florida during 1980 ranged from a high of 77.64 percent for Gulf Power's Smith 1 unit to a low of 32.92 percent for GPC's Crist 7.

This is remarkably close to the design criteria used by the Florida Electric Coordinating Group in projecting the output of new base-load plants: According to the FCG, a new coal-fired base-load plant is designed to achieve a 70 percent capacity factor, but in operation, with a 19 percent forced outage rate, is projected to achieve a capacity factor of 51 percent. "Forced outages" include scheduled and unscheduled periods of maintenance. Environmental Impact Statements prepared for major coal-fired power plants in Florida in recent years have frequently used a projected capacity factor of 66 percent.

Table I-6 shows the capacity factors for coal plants in Florida projected for 1990 by the DOE/SAI study in 1983 assuming no conversion of oil-fired units. Note that this study shows relatively high capacity factors for the large, base-load units; the projected capacity factors range from a high of .76 for Gainesville's Deerhaven 2 to a low of .60 for Lakeland's McIntosh 3. These figures can be compared with the projected capacity factors for 1990 given in Table I-8, assuming an aggressive coal conversion program. In this case, the capacity factors of large, base-load coal units drops to an average of about .59 .

3. The Cost of New Coal-Fired Power Plants

Even with the trend to larger, more economical power plants, the cost of new power plants has been rising steadily in recent years. The cost has risen not only due to inflation but the cost per kilowatt of coal-fired power plants has risen in terms of constant-value dollars.

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* These capacity factors are based on maximum or gross megawatt ratings. If they had been computed on peak summer or winter capacity, which is often 10 to 15 percent higher, the capacity figures would have been somewhat higher.

Table I-5: Capacity Factors of Coal-Fired Power Plants in Florida, 1980.

UTILITY/PLANT	IN-SERVICE DATE	MAX (GROSS) CAPACITY (MW)	1980 GENERATION (MWH)	CAPACITY FACTOR (MWH/8760 x capacity)
I. FLORIDA POWER CORP.				
1. Bartow 1 (C-O-M)	1958	127.5		
2. Crystal River 1	1966	440.5	2277.1	59.01
3. Crystal River 2	1969	523.8	2208.1	48.12
SUBTOTAL		1091.8	4485.2	46.90
II. TAMPA ELECTRIC CO. (TECO)				
1. Big Bend 1	1970	445.5	1500.3	38.44
2. Big Bend 2	1973	445.5	2373.8	60.83
3. Big Bend 3	1976	445.5	2565.9	65.75
4. Gannon 5	1965	239.4	1113.2	53.08
5. Gannon 6	1967	414.0	2071.8	57.13
SUBTOTAL		1989.9	9625.0	55.22
III. GULF POWER CORP.				
1. Crist 6	1970	369.8	1113.3	34.37
2. Crist 7	1973	578.0	1666.9	32.92
3-4. Scholz 1-2	1953	98.0	317.0	36.93
5. Smith 1	1965	149.6	1017.5	77.64
6. Smith 2	1967	190.4	1050.8	63.00
7. Crist 3 & 4	1952(&'59)	187.5	69.4	30.84
SUBTOTAL		1573.3*	5234.9	42.55
GRAND TOTAL, 1980		4655.0*	19345.1	49.25

*Includes only coal-fired units in operation.

NOTE: CAPACITY FACTOR COMPUTED ON MAXIMUM (GROSS) MW, NOT ON WINTER PEAK MW.

Table I-6: Projected 1990 Coal Demands for All Potential Coal-Fired Powerplants and Capacity Factors, Assuming No Additional Conversion of Oil Units. Source: DOE/SAI (1983).

Utility and Generating Station	Units	Average Plant Capacity Factor†[1]	Projected 1990 Coal Demand†[1] (10^3 tons)
Florida Power Corporation			
Crystal River	1-5	0.620	4,582
Florida Power & Light Company; Jacksonville Electric Authority			
St. Johns River	1,2	0.680	2,568
Gainesville Regional Utilities			
Deerhaven	2	0.760	642
Gulf Power Company			
Crist	4-7	Not available	2,000
Scholz	1,2	Not available	230
Smith	1,2	Not available	1,000
City of Lakeland; Orlando Utilities Commission			
McIntosh	3	0.600	726
Orlando Utilities Commission; Florida Municipal Power Agency; City of Lakeland			
Stanton	1	0.690	1,016
Seminole Electric Cooperative			
Seminole	1,2	0.685	2,917
Taylor	1,2	0.700	2,987
Tampa Electric Company			
Big Bend	1-4	0.719	3,831
Gannon	1-6	0.664	2,779
TOTAL			25,278

†[1] Estimates obtained from dispatch analysis conducted by Science Applications, Inc. for U.S. Department of Energy, Fuels Conversion Division--except Crist, Scholz, and Smith estimates provided by the utility.

As seen in Table I-7, in 1982, the average cost of new coal-fired capacity coming into service in Florida was $710/kW while the average cost of plants coming on-line in 1987 is projected to be $1115/KW, in constant 1982 dollars.

The prime reason for the trend toward larger and larger units is to obtain lower costs for power production. As shown below, according to the FCG, the "cash price" of a typical, "generic" coal-fired 600-MW base load plant would be $1,047 per kilowatt in 1983; however, if the cost of finance at 1983 interest rates is added to this figure, with taxes, the cost for a 600-MW unit would rise to $1,731/KW, and to $2,170/KW for a smaller 425 MW unit. This shows a direct economy of scale, using inflated, not constant, dollar payback figures.

CAPACITY (MW)	CASH PRICE (Mill. 1983 $)	$/KW	INTEREST (Mill $)	TOTAL COST (20 yrs)	TOTAL ($/KW)
600	628.20	1047.0	195.22	1038.40	1730.67
425	444.98	1047.0	162.48	922.27	2170.05

4. Fuel Supply

As seen in Table I-8, in 1982 coal-fired power plants in Florida consumed an estimated 10,930 tons of coal. Of this amount, 34.5 percent of Florida's coal was delivered by rail, 64.5 percent by water, and 0.9% by truck. As seen in Fig. I-6, most of the coal delivered to Florida today is by barge, although three sites--Gainesville's Deerhaven plant in Alachua County, TECO's Gannon plant in Hillsborough County, and Gulf Power's Scholz plant in Jackson County--receive coal by rail:

a. Rail Delivery

FPC'S Crystal River 1 & 2--About half the coal used by FPC's Crystal River units 1 & 2 is delivered via 72-car unit trains. The cars are owned by FPC. Final delivery is made by Seaboard Coast Lines (SCL).

Table I-7: The Cost of New Coal-Fired Power Plants Coming On-Line in Florida 1982-1987.
Source: Florida PSC (Dec., 1983 and Dec., 1982).

POWER PLANT	OWNERSHIP	CAPACITY (MW)	IN-SERVICE DATE	COST (Mill.$)	COST (1982 $)	$ / KW (1982)
McIntosh 3	OUC/LAK	334	1982	229	229	686
Crystal River 4	FPC	640	1982	469	469	733
				1982 Average	=	$710
Seminole 1	SECI	600	1984	415	377	628
Crystal River 5	FPC	640	1984	409	338	528
				1984 Average	=	$578
Seminole 2	SECI	600	1985	415	312	520
Big Bend 4	TECO	417	1985	581	437	1048
				1985 Average	=	$784
St. Johns Riv.Pwr. Prk	JEA/FPL	550	1987	871	654	1189
Stanton 1	OUC/LAK	415	1987	662	432	1041
				1987 Average	=	$1115
St. Johns. Riv. Pwr.	JEA/FPL	500	1988	871	541	1082
TOTAL		4696		4892	3789	

DOLLAR PER KILOWATT, current $ = $1042
DOLLARS PER KILOWATT, 1982 $ = $807

Table I-8: Estimated Annual Coal Use by Florida Powerplants in Operation in 1982. Source: DOE/SAI (1983).

Utility and Generating Station	Unit	Net Capability†[1] (MWe)	Estimated Annual Coal Use†[2] (10^3 tons)	Potential Coal Supply Region†[2]
Florida Power Corp.				
Crystal River	1	373	1,000	S. IL; E. KY
	2	469	1,200	
Gainesville Regional Utilities				
Deerhaven	2	235	700	WV; KY; VA
Gulf Power Co.				
Crist	4	81	250	IL; AL
	5	86	250	
	6	317	500	
	7	486	1,000	
Scholz	1	46	115	AL; IL; E. KY
	2	46	115	
Smith	1	160	1,000	IL; AL
	2	188	(total)	
City of Lakeland; Orlando Utilities Commission				
McIntosh†[3]	3	334	800	E. KY
Tampa Electric Co.				
Big Bend	1	376†[4]	2,800	E. KY; W. KY;
	2	362	(total)	S. IL; OK
	3	385†[4]		
Gannon	5	218	1,200	E. KY; W. KY;
	6	361†[4]	(total)	S. IL; OK
TOTAL			10,930	

†[1] Data from Florida Electric Power Coordinating Group, Inc. (1982).

†[2] Coal use estimates, except McIntosh, and potential supply regions provided by the respective utilities; coal use for McIntosh was assumed since utility estimates were not available.

†[3] McIntosh Unit 3 brought on-line during 1982; the others were on-line prior to 1982.

†[4] Net capability that will be on-line in 1983 (1982 capabilities are slightly less).

TECO--The CAL-GLO mine in southeastern Kentucky supplies approximately two-thirds of the coal used by Tampa Electric Co (TECO). The primary delivery mode to GAnnon is by unit trains using 80-ton cars owned by the railroad. The Seaboard System Railroad is used, with final delivery via SCL.

Gulf Power--Coal is delivered to the Scholz plant of the Gulf Power Corp. from the Illinois basin and eastern Kentucky via the Louisville and Nashville Railway (L&N). Gulf Power's Daniel plant in Mississippi, which supplies power to Florida, also receives coal by rail. It is interesting in that it is the only plant operated by a Florida utility that receives western coal. Unit trains are made to the Daniel plant from Colorado and utah.

Municipal Utilities--The Gainesville-Alachua County Regional Utility Board (RUB) has a long-term contract for coal for its Deerhaven plant from West Virginia, and makes spot purchases from Kentucky and Virginia. The unit train with utility-owned cars travels over the CSX system.

Coal is delivered to the McIntosh plant from a mine in eastern Kentucky via a 70-car unit train; final delivery is over the SCL system.

b. Coal Deliveries by Water

Florida Power Corp.--FPC receives the other half of its coal deliveries for the Crystal River plan via water from southern Illinois. The coal is barged down the Mississippi River to New Orleans and then transloaded to 17,500-ton barges for delivery to the plant, which is located on the Gulf of Mexico.

Tampa Electric Co.--TECO currently receives about one-third of its coal for the Gannon and Big Bend plants via water. This coal comes from western Kentucky and southern Illinois. The companies involved with the water transport of the coal (Mid-South Towing Co, Gulf Coast Transit, and Elctro Coal Transfer Corp.), along with TECO itself, are all subsidiaries of TECO Energy, a holding company. TECO has also received Polish coal by water.

Gulf Power Corp.--The major portion of coal used at GPC's Crist and Smith plants comes from southern Illinois. It is shipped down the Ohio and Mississippi rivers in river barges; south of New Orleans, the 25- to 40-barge tows are broken into 4-barge tows and brought through the Gulf Intracoastal waterway and up the Escambia River to Crist, or directly to Smith on the Intracoastal. During the 1970's the Smith plant burned South African coal.

5. Annotated Bibliography

Berkshire County Regional Planning Commission. Evaluation of Power Facilities: A Reviewer's Handbook. (Pittsfield, MA: Berkshire County RPC, April, 1974). Available ILL: FSU Call Nr. DOC HD 9685 U5.

This is probably the best single-volume introduction to power plant technology and issues, and should be a basic reference for any planner dealing with power plant siting issues. Although it is presently somewhat out of date as regards recent federal regulations and recent developments in evironmental protection technology, it serves as an excellent document for the overall description of power plant technology and siting issues.

Florida Electric Power Coordinating Group. 1983 Annual Planning Workshop: Composite Forms. (Tampa, FL: FCG, 1983).

This volume, prepared each year by the FCG for the Annual Planning Workshop of the Public Service Commission provides detailed planning assumptions regarding the cost of new plants, the projected need for new facilities and future purchases of fuel.

Shannon, Robert. Handbook of Coal-Based Electric Power Generation: The Technology, Utility Application and Economics of Coal for Generating Electric Power. (Park Ridge, NJ: Noyes Publications, 1982). 372 pp. Avail. ILL: Univ. of Florida Call Nr.TK 105/S34 1982.

This is an excellent one-volume introduction to the engineering of power plants. Using reports published by the federal government, this book describes the state-of the-art on power plant engineering, and provides a wealth of background information pertinent to the overall operation and design of coal-fired power plants.

C. IMPACTS OF INCREASED COAL USE IN FLORIDA

The Florida electric utility industry has projected that coal consumption in Florida by the turn of the century will be more than 300 percent above the 1983 level. Further, industry forecasts imply that the decade 1991-2001 could see the growth of coal-fired capacity of 13,500 MW, equivalent to 25 new 650-MW plants.

An increase in coal consumption of this magnitude will have major implications for the state. This section briefly examines two of these: the impacts on the state's economy, and the impact on reliability of the state's electrical system. The projected impacts that this level of expansion would have on air quality are discussed in Chapter 5 and the impacts on the state's transportation system are discussed in Chapter 7.

1. Economic Impact

The electric utility industry maintains that the cost of a new 600 MW coal-fired power plant coming on-line in 1987, including the cost of interest, would be $1730 per kW, in constant 1982 dollars. This means that the total cost of a 600-MW plant would be about $1.04 billion including interest charges and taxes.

Projecting the dollar amounts that utilities of the state are likely to spend on this new capital construction is not easily done, owing to vicissitudes of costs, demand for power, imprecise plans regarding the type of equipment which would be purchased, and so forth. Nevertheless, from these figures it can be shown that if the electric utilities of Florida were to construct the 13,500 MW of coal-fired capacity which which has been projected but not certified, at a 1983 cost of $1730/kW this would require the expenditure of $23.4 billion dollars. However, since a portion of this coal capacity would be represented by oil-fired plants converted to coal, the actual cost would be less than this amount, depending on the number of plants converted. A cost of $23.4 billion (in constant 1983 dollars) would be equivalent to $1843 per person in 1990, assuming the 1990 population is 12.7 million.

Not only is capital cost for new construction extraordinarily expensive, the cost of fuel for coal-fired power plants is equally expensive. As seen in Fig. I-15, in 1980 coal delivered to Florida averaged slightly over $1.90 per million Btu (MMBtu), which was equivalent to a weighted average of $43.29 per ton. Using economic forecasts of the Data Resources Inc. (DRI), in 1982 the FCG predicted that between 1980 and 1996, coal prices will almost double in terms of constant dollars; and in terms of inflated, current dollars, coal prices will nearly quadruple over that time period. This will have a significant impact on utility prices charged to ratepayers--and therefore impacts on the state's economy. Even though the cost for both capital expansion and for fuel purchase are exceedingly large, they must be compared with the cost of other alternatives, such as oil-fired power, nuclear, or conservation to offset the need for new expansion. (See Chapter 8 for further discussion of these comparisons.)

2. Impact on Reliability

To increase the reliability of electric power, utilities maintain a "reserve margin"--i.e., they try to have more generating capacity than will be needed to meet the expected level of demand. According to the U. S. Dept. of Energy, the average utility in the nation maintains a reserve margin of 15-25 percent . The optimum reserve margins for four typical large utilities is given in Fig. I-16; for these cases, the optimum was found to be 26 percent.

Fig. I-15. The Cost of Coal Burned by Electric Power Plants in Florida, 1960 - 1996. Sources: Historical = PSC (1983); Projected = FCG (1983).

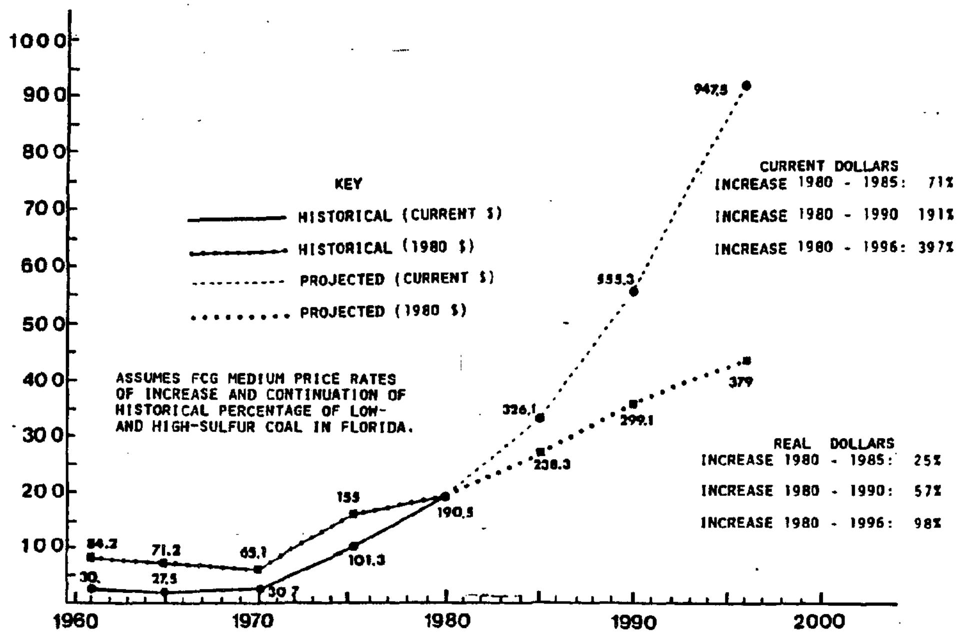
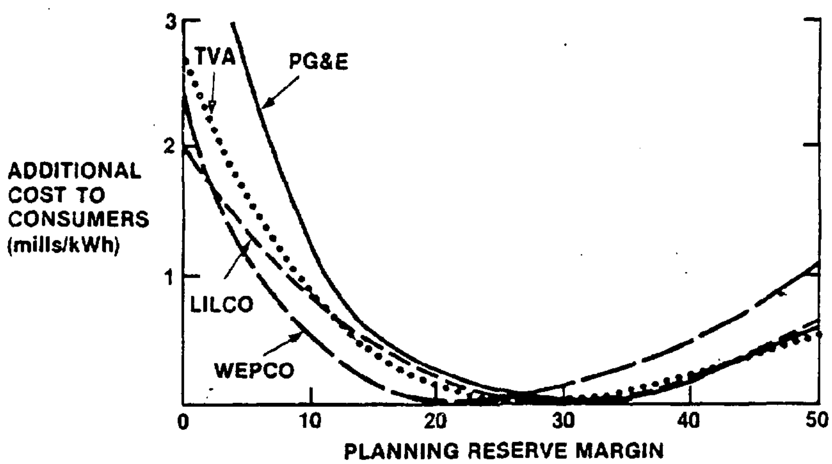


Fig. I-16. Optimum Reserve Margins for Four Major Utilities. Source: Cazalet (1978).



As seen in Table I-9, in 1983 the electric utilities of Peninsular Florida had an expected reserve margin of 42 percent; that is, there was an an expected peak demand of 19,410 MW, and available capacity 42 percent higher: 26,612 MW. These figures do not include Gulf Power Corp., a subsidiary of the Southern System, which can be computed separately.

Assuming power plants presently under construction come on line and demand continues to increase as the utilities forecast, the Florida electric utility industry expects the reserve margin of Peninsular Florida to increase to 48 percent by 1989. Under the proposed construction schedule of the utilities, this reserve margin would then fall by 2002 to 33 percent.

Also shown in Table I-9 is the "Loss of Load Probability" (LOLP) under different reserve margins. This term is one which all planners dealing with utility systems planning need to understand. LOLP can be defined as the probability that at some unspecified time, usually during a period of peak demand, the utility would fail to meet all power demands. As the reserve margin is increased, the LOLP is decreased.

The question of how large the reserve margin should be is the key issue: It costs billions of dollars to construct plants which are not used to their fullest capacity. Planners involved with the Need for Power Determination proceedings of the Public Service Commission, explained in Chapter 2, will need to consider this question as the central issue to be addressed.

On the other hand, failing to have an adequate supply of power is equally undesirable; there is a severe economic penalty for not constructing needed capacity. One study conducted in Florida concluded that the cost of a power outage to commercial and industrial customers stemming from lost business, spoiled goods, production delays and so forth amounted to $2.19 per kilowatt-hour (kWh). For a small business that may consume 5000 kWh per month, a loss of one-day's service would be painful enough; for a large industry which may consume 1 million kWh per month, the loss of power for a period of days could be disastrous.

Table I-9. Summary of Capacity, Demand and Reliability at Time of Summer Peak for Peninsular Florida, As Projected by the Florida Electric Coordinating Group, 1983. Source: FCG (1983).

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
					Reliability Indices		
					Reserve Margin		LOLP
Year	Installed Capacity (MW)	Capacity Import (MW)	Available Capacity (MW)	Peak Demand (MW)	(MW)	% of Peak	Days/Year
1983	26962	650	27612	19410	8202	42	.0111
1984	26934	950	27884	19980	7904	40	.0055
1985	28613	2000	30613	20546	10067	49	.0005
1986	28591	2000	30591	21146	9445	45	.0013
1987	29546	2500	32046	21611	10435	48	.0001
1988	29589	2400	31989	22081	9908	45	.0005
1989	30843	2400	33243	22487	10756	48	.0001
1990	30821	2400	33221	23105	10116	44	.0007
1991	31412	2400	33812	23957	9855	41	.0016
1992	31837	2400	34237	24657	9580	39	.0029
1997	35992	0	35992	27815	8177	29	.0906
2002	40917	0	40917	30797	10120	33	.0696

Therefore, the question of excess reserve margin has been a highly controversial question in power plant siting proceedings. Critics have pointed out that when the Orlando Stanton 1 plant comes on-line the utility will have a reserve margin of 83 percent and that the Gainesville utility has a reserve margin of 53 percent. The Public Service Commission contends that these extraordinarily high reserve margins have been necessary to reduce oil consumption and meet high population growth.

3. Annotated Bibliography

ECONOMIC IMPACTS

Florida Electric Coordinating Group. Ten Year Plan: Annual Planning Workshop. (Tampa, FL: FCG, 1983). 4 vols.

Florid Public Service Commission. Statistics of the Florida Electric Utility Industry: 1982. (Tallahassee, FL: PSC, Dec., 1983).

SYSTEM RELIABILITY

Cazalet, Edward et al. Costs and Benefits of Over/Under Capacity in Electric Power System Planning. (Palo Alto: EPRI, October, 1978). EPRI Rpt. Nr. EA-927.
One of the biggest issues in systems planning is how big a reserve margin is adequate. This publication develops a model for considering reserve margins, and recommends a margin of about 30% for four large utilities.

Fowler, M. J. "Power Plant Performance." Environment. Vol. 20, No. 3 (April, 1978), pp. 25-32.
Useful article; discussed the percentage of time which various types of power plants are out of service.

Green, A. E. S. The Impact of Increased Coal Use in Florida. (Gainesville, FL: Univ. of Florida, 1979). 2 vols.
This study, funded by the STAR program of the State University System, was prepared by a consortium of professors at the Univ. of Florida. Unfortunately, it was never published in a typeset format, and is available only in an office copier format. It was prepared on the request of the State Energy Office and even though it uses projections which are now out of date, it is very useful, particularly regarding environmental impacts of power plants. The research for this report lead to Coal Burning Issues, discussed below.

Mosbaeck, E. J. Power Shortage Costs: Estimates nd Applications. (Palo Alto, CA: EPRI, Dec. , 1981). EPRI Rpt. Nr. EA-1215. 3 vols. Interesting study of power outages, including one in Florida. This study shows the high cost of power outage: $2.19/kWh in Key West, showing drop in dollar drop in commercial sales resulting from outages.

North American Electric Reliability Council. Thirteenth Annual Review of Overall Reliability and Adequacy of Bulk Power Supply in the Electric Utility Systems of North America. (Princeton, NJ: North American Electric Reliability Council, August, 1983). 56 pp.
This publication, a summary of utility projections and reserve margins, appears each year. It is the standard basis of utility planning forecasts.

PART II

POWER PLANT SITING

CHAPTER 2

POWER PLANT SITING IN FLORIDA

CHAPTER 2

POWER PLANT SITING REGULATIONS IN FLORIDA

The licensing of new power plants in Florida is governed predominantly by the Power Plant Siting Act, sections 403.501 - 519, Florida Statutes. Part A of this chapter details the provisions of this legislation, Part B describes the seven-step certification process and Part C details the responsibilities of state and local government agencies under this act.

A. FLORIDA POWER PLANT SITING

1. The Power Plant Siting Act

Passed in the 1973 legislative session, the Florida Electrical Power Plant Siting Act (PPSA) became effective July 1, 1973. The PPSA was designed to provide a one-stop site certification procedure for construction or expansion of steam, solar or nuclear electrical power plants. It also provided for coordination of long-range planning by electric utilities with local and state planning agencies. The act is included as Attachment I.

The legislative intent of the PPSA was to provide a centrally coordinated state approval system for each proposed site. The act recognized that selection of power plant sites and associated transmission corridors would have a significant impact on the welfare of the population, location and growth of industry, and the use of the state's natural resources. Under the act, a new plant would be issued a permit only after a review conducted by a number of state agencies.

In the PPSA, the Legislature recognized the need for power generation facilities. But it also stated, in section 403.502, that the legislative intent is to ensure that "the location and operation of electrical power plants will produce minimal adverse effects on human health, the ecology of the land and its wildlife and the ecology of state waters and their aquatic life." The legislative intent was for state agencies to balance the increasing demands for electrical energy with the broad interests of the public. The act was passed by the Legislature at the request of the Florida electric utilities who felt that obtaining numerous separate permits from regulatory agencies was too time consuming and led to too many uncertainties.

Since the enactment of the PPSA, it has been amended a number of times. In 1975, final certification authority was given to the Florida Cabinet and the Division of Administrative Hearings was assigned the authority to conduct the certification hearings. In 1976 Water Management Districts were added to the review process by rule, and in 1979 power plants less than 50 megawatts (MW) in size were exempted from the act. In 1981 Water Management Districts were added as a statutory party.

In 1980, the Legislature adopted language making the Florida Public Service Commission (PSC) the exclusive agency of state government authorized to certify the need for new power plants and transmission lines. The amendment directed the PSC to consider both the cost-effectiveness of a proposed facility, and the role of conservation in meeting future need for power. In 1981, the PPSA was amended to allow applicants for units smaller than 50 MW to use the PPSA voluntarily.

2. <u>Provisions of the PPSA</u>

As seen in Attachment II, the Power Plant Siting Act directs the Department of Environmental Regulation to:

1. Adopt, promulgate or amend reasonable rules to carry out the provisions of the act, including rules setting forth env ironmental precautions to be followed in relation to the location of electric power plants.

2. Prescribe the form, content, and necessary supporting documentation for site certification applications.

3. Receive applications for final site locations and to investigate their sufficiency.

4. Make, or contract for studies of electrical power plant site certification applications.

5. Conduct hearings on the proposed location of the electric power plant sites.

6. Require an application fee not to exceed $50,000 for each application for certification.

7. Prepare a written report which is to include:

   a. A statement indicating whether the application is in compliance with DER's rules.

   b. A report from the Public Service Commission setting forth the need for electricity in the area to be serve.

   c. A report from the Department of Community Affairs regarding compatibility of the application with the State Comprehensive Plan.

   d. A report from the affected water management district.

e. An assessment of the environmental effects of the construction and operation of the plant, and the results of any studies conducted.

f. Comments received by DER from any other agency.

g. A recommendation as to the disposition of the application.

8. Give adequate public notice and to directly notify all concerned state or local agencies and report any comments received from these agencies to the Siting Board (i.e., the Florida Cabinet) and to the applicant.

9. Prescribe the means for monitoring the effects arising from the construction and operation of electrical power plants to assure continued compliance with terms of certification.

The report prepared by DER to meet the requirements of the legislation is known as a "Staff Analysis Report." The Bibliography provided below in Section 3 lists each staff analysis report currently available to planners. As shown in Table II-1, by January 1, 1984, a total of 18 applications had been received during the ten years the Power Plant Siting Act has been in effect.

The Power Plant Siting Section of the Florida Department of Environmental Regulation currently has responsibility for implementing this legislation. For more information, contact:

Power Plant Siting Program Administrator
Power Plant Siting Program
Florida Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32301
tel. 904/488-0310

Table II-1. Power Plant Siting Applications Received by the Florida Dept. of Environmental Regulation, 1973-1983. (Source: DER)

STATUS POWER PLANT SITING APPLICATIONS						
Application Number	Plant/Unit # and Location	Utility	Type Unit and Rating	Application Received	Environmental Hearing	Certification Date
PA74-01	Putnam Palatka	Florida Power and Light Co.	Combined Cycle/ Oil-Fired 242 MW summer 290 MW winter	12/03/73	8/30/74*	10/16/74*
PA74-02	St. Lucie #2 Hutchinson Island	Florida Power and Light Co.	Nuclear 802 MW	01/24/74	06/16/75 - 07/16/75; 02/23-25/76	05/18/76
PA74-03	Hopkins #2 Tallahassee	City of Tallahassee	Fossil Steam Oil/Gas Fired 238 MW	02/15/74	03/17/75	05/20/75*
PA74-04	Deerhaven #2 Gainesville	Gainesville/Alachua County Regional Utilities Board	Fossil Steam Coal-Fired	03/14/74 Revised 12/09/77	04/27/78	05/16/78
PA74-05	Lake Worth Lake Worth	Lake Worth Utilities Authority	Combined Cycle Oil-Fired 29 MW summer	06/24/74 Revised 10/08/75	11/19/75	05/18/76
PA74-06	Lake Parker #3 Lakeland	Lakeland Utilities	Fossil Steam Gas/Oil-Fired Revised to Coal/Gas/Refuse Fired	07/74 Revised 05/29/75		
PA74-06SR	Revised to: McIntosh #3	Lakeland Utilities/ Orlando Utilities Commission	Fossil Steam Coal/Refuse-Fired 334MW	Revised 04/17/78	08/15-16/78	12/07/78
PA75-07	B.F. Ellis Caryville	Gulf Power Corporation	Fossil Steam Coal-Fired Ultimate MW3000	04/24/75	12/03/75	05/07/76**
PA77-08	Dade County Resource Recovery Facility	Dade County (& Fla. Power and Light)	Steam Refuse-Fired 48 MW	08/08/77	11/02/77	01/09/78
PA77-09	Crystal River #4 and #5 Crystal River	Florida Power Corporation	Fossil Steam Coal-Fired 640 MW each	12/14/77	09/18-20/78	11/21/78
PA78-10	Seminole #1 & #2 Palatka	Seminole Electric Cooperative	Fossil Steam Coal-Fired 620 MW each	08/07/78	06/04/79	09/18/79
PA78-11	Pinellas County Resource Recovery Facility St. Petersburg	Pinellas County	Steam Refuse-Fired 50 MW	10/31/78	05/24/79	07/20/79
PA79-12	Big Bend #4 Ruskin	Tampa Electric Co.	Fossil Steam Coal-Fired 425 MW	10/01/79 (Incomplete) 08/19/80	06/23/81	08/17/81
PA81-13	St. Johns River Power Park Jacksonville	Jacksonville Electric Authority/Fla. Power & Light Co.	Fossil Steam Coal-Fired 2- 600 MW units	02/18/81	12/1-4/82	06/29/82
PA81-14	Stanton Plant #1 Orange County	Orlando Utilities Commission	Fossil-Steam Coal/Refuse Fired 415 MW (2000 MW Ultimate)	09/18/81	3/15-23/82	12/15/82
PA82-15	Taylor Plant Taylor County	Seminole Electric Cooperative	Fossil Steam Coal-Fired 2 600 MW Units	Notice of Intent 02/10/82		**
PA82-16	McInnes Hillsborough/ Manatee Counties	Tampa Electric Company	Fossil Steam Coal-Fired 500 MW	Notice of Intent 03/04/82		**
PA82-17	Fla. Crushed Stone Cement Plant Hernando County	Fla. Crushed Stone Company	Steam Cogeneration 125 MW	10/18/82 (Incomplete) 11/16/82	08/2-5/83	03/09/84
PA83-18	Pinellas Co. Resource Recovery Facility Expansion St. Petersburg	Pinellas County	Steam Refuse-fired 29 MW addition	found complete 09/06/83	02/29/84	03/20/84
PA83-19	Hillsborough Co. Resource Recovery Facility Tampa	Hillsborough County	Steam Refuse-fired 29 MW (39 MW ultimate)	Notice of Intent 07/22/83		
PA84-10	Palm Beach Co. Resource Recovery Facility West Palm Beach	Palm Beach County	Steam Refuse-fired ? 50 MW			

3. Bibliography

Planners who become involved with power plant siting or transmission line siting applications would benefit from reading applications which have been received in previous years. The following is a bibliography of selected power plant siting studies and applications which may be useful to planners facing reviews of future siting applications.

STATE REGULATIONS: GENERAL

Florida Sierra Club. Power Plant Siting Handbook (Gainesville, FL: Florida Sierra Club, 1601 N. W. 35th Way, Gainesville, FL 32605, n.d.).

This publication, assembled by the Sierra Club with the assistance of the Department of Environmental Regulation, is designed as a guidebook for citizens and activists. It includes copies of relevant legislation and regulations.

Green, Alex A. E. (ed.) The Impact of Increased Coal Utilization in Florida. (Gainesville, FL: Univ. of Florida, 1979).

This study includes several sections on power plant siting regulations prepared by attorneys.

POWER PLANT SITING CASES IN FLORIDA

Gainesville/Alachua Cnty. Reg. Util. Board: Deerhaven Unit 2

Florida Dept. of Environmental Regulation, Power Plant Siting Program. Electric Power Plant Site Certification Review for Gainesville/Alachua County Regional Utilities Board Unit. No. 2, Case No. PA 74-04. (Tallahassee, FL: DER, March, 1978).

Florida Power Corp.: Crystal River Units 4 and 5

Florida Power Corp. Site Certification Application: Crystal River Units 4 and 5. (St. Petersburg , FL: Florida Power Corp. Dec, 1977). 4 vols.

Fla. Div. of Admin. Hearings. In re: Florida Power Corporation Crystal River Units 4 and 5, Case No . 77-2212. (Tallahassee, FL: Div. of Administrative Hearings, Oct., 1978), 18 pp.

U. S. Environmental Protection Agency. Draft Environmental Impact Statement, Florida Power Corp. Crystal River Units 4 and 5. (Atlanta, GA: USEPA Regional IV Office, July, 1980). NTIS Nr. EPA 904/9 -80-048. 2 vols.

U. S. Environmental Protection Agency. Final Environmental Impact Statement, Florida Power Corporation Crystal River Units 4 and 5. (Atlanta, GA: USEPA Region IV Office, January, 1981).

Florida Power and Light: St. Lucie 2

Fla. Div. of Admin. Hearings. In re: Florida Power and Light Co. Applications for Power Plant Site Certification St. Lucie Nuclear Plant No. 2. Case PA-74-02. (Tallahassee, FL: Dept. of Administration, Oct., 1975). 34 pp.

U. S. Nuclear Regulatory Commission. Draft EIS Related to Operation of St. Lucie Plant, Unit 2 Docket 50-389. (Washington, D.C.: U. S. Nuclear Regulatory Commission, October, 1981). NTIS Nr. NUREG-0842.

Florida Power and Light: Turkey Pt. Units 3 and 4

U. S. Nuclear Regulatory Commission. Final Environmental Statement Related to Steam Generator Repair at FPL Turkey Pt. Plants Units 3 & 4. (Washington D. C.: U. S. NRC, March, 1981). NTIS Nr. NUREG-0743.

Jacksonville Elec. Auth.: JEA/FPL St. Johns River Power Park

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Florida Public Service Commission. In re: JEA/FPL Application of Need for St. Johns River Power Park Units 1 and 2 and Related Facilities, Order No. 10108. (Tallahassee, FL: Florida Public Service Commission, June, 1981).

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Lakeland Utilities

Fla. Div. of Admin. Hearings. In re: Application for Electrical Power Plant Site Certification, City of Lakeland Unit. No. 3, Case No. 76-922. (Tallahassee, FL: Div. of Administrative Hearings, Nov. , 1976), 10 pp.

Florida Dept of Environmental Regulation, Power Plant Siting Section. Electric Power Plant Site Certification Review for the City of Lakeland Unit No. 3 Power Plant. (Tallahassee, FL: DER, May, 1976).

Orlando Utilites Cmmsn: Stanton Energy Center Unit 1

Orlando Utilities Commission. Site Certification Application, Curtis H. Stanton Energy Center, Unit 1. (Orlando, FL: Orlando Utilities Commission, May, 1981). 5 vols.

Fla. Div. of Admin. Hearings. In re: Application of Orlando Utilities Commission Curtis Stanton Energy Center Site Certification, Case No. 81-1431. (Tallahassee, FL: Div. of Adminis-trative Hearings, Nov., 1982).

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Seminole Electric Coop., Inc: Seminole Units. 1 and 2

Seminole Electric Cooperative. Site Certification Application and Environmental Analysis: Seminole Plant Units 1 and 2. (Tampa, FL: SECI, August, 1 978). 4 vols.

Tampa Electric Co.: Big Bend Unit 4

Tampa Electric Co. Site Certification Application for Big Bend Station Unit 4. (Tampa, FL: TECO, Oct., 1979). 4 vols.

Florida Dept. of Environmental Regulation. Conditions of Certification:Crystal River Units No. 4 & 5, Case No. PA 77-09. (Tallahassee, FL: DER, Jan. 21, 1980).

Florida Div. of Admin. Hearings. In Re: Florida Power Corporation Crystal River Units 4 & 5, Case No. 77-2212. (Tallahassee, FL: Div. of Admin. Hearings, Nov. 21, 1978).

U. S. Environmental Protection Agency. Draft Environmental Impact Statement, Tampa Elect. Co., Big Bend Unit 4 (Atlanta, GA: USEPA Region IV Office, July, 1981). NTIS Nr. EPA 904/9-81-070.

U. S. Environmental Protection Agency. Draft Environmental Impact Statement: Tampa Electric Co. Big Bend Unit. Nr. 4: Technical Reference Document. (Atlanta, GA: U. S. EPA Region IV, Oct., 1981). 2 vols.

B. THE POWER PLANT SITING PROCESS

The Power Plant Siting Act establishes a nine-step process for the certification of a proposed power plant. This procedure is similar in many respects to the procedure established for the certification of transmission lines described in Chapter 9. These steps are as follows:

1. Pre-application discussions
2. The Need for Power Order of the Public Service Commission
3. DER review for sufficiency and completeness
4. Certification review and studies
5. Land use hearing
6. The certification hearing
7. The Recommended Order of the Division of Administrative Hearings
8. The Order of the Governor and Cabinet
9. Post-certification review by DER

This process is used for both new power plant site applications and for "supplemental" applications--i.e., those for an addition to an existing plant.

The regulations issued by DER to govern this siting process are found in Chapter 17-17, Florida Administrative Code, and are reproduced in Attachment IV of this handbook. Additional copies are available free from the Public Information Office of DER (904/488-9334), and are available at any public library in the state. (See Fig. II-1)

1. Preapplication Discussions

Pre-application discussions begin as much as one year before an application is submitted. During this time the utility may elect to file a "Plan of Study" with DER detailing the kinds of information it will submit with the application. Normally, the utility meets with officials of DER and other agencies to discuss the features of the project and the methodologies to be used in conducting baseline studies. See the Bibliography, Section 3 of Part A, for references to several typical Plan of Study documents. The information to be submitted by the utility in the formal certification application is listed in DER rule 17.1, the application instructions.

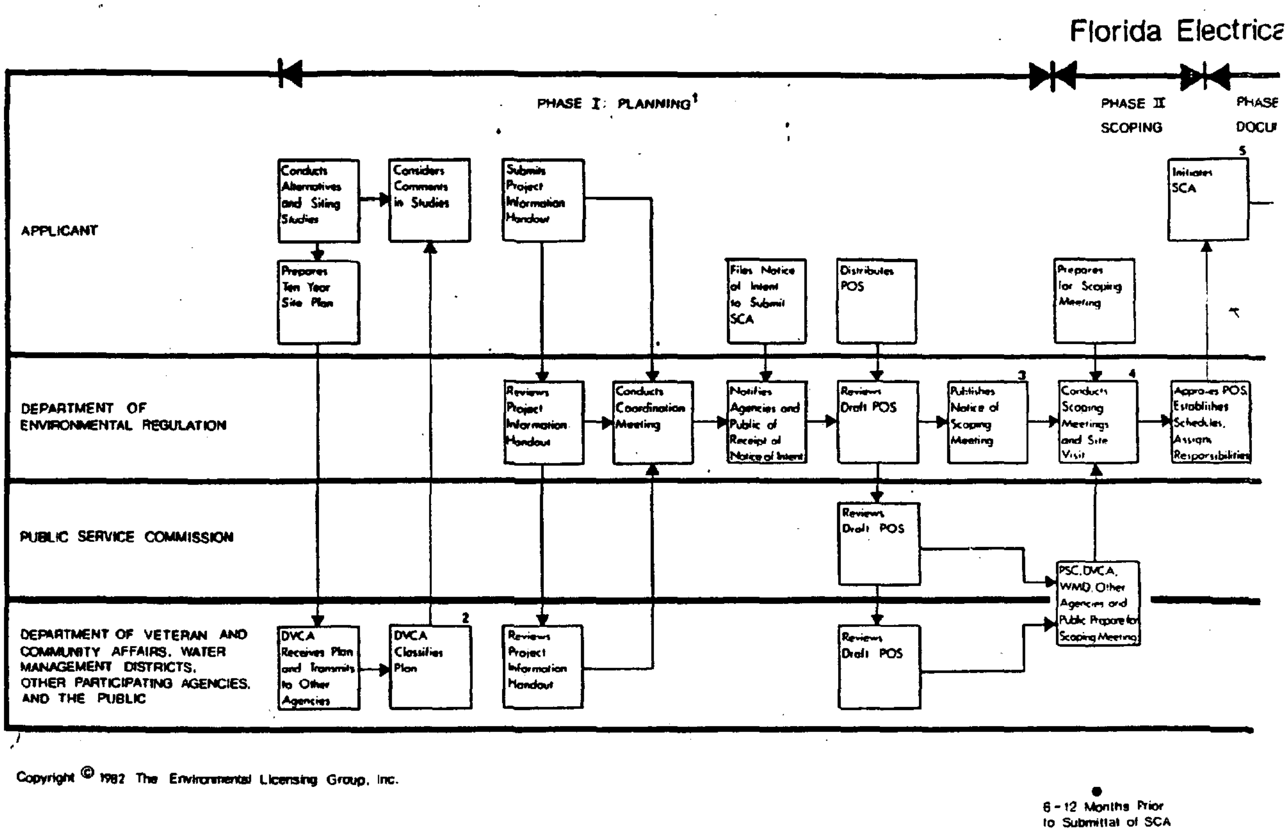
2. PSC Determination of Need Proceedings

The Public Service Commission (PSC) must issue a "Determination of Need" order before a proposed power plant line can be approved. The PSC Need for Power process may be conducted either before or after DER receives the certification application, but the PSC order must be given before the proposed plant is considered by the Governor and Cabinet. The PSC's regulations are found in Ch. 25-22.81, Florida Administrative Code (Attachment V).

Proceedings to determine the need for a proposed electrical power plant begin with a petition by a utility or on the Commission's own motion. Proceedings may begin prior to the filing of an application for site certification of the proposed power plant. The petition must contain information about the proposed plant's impact on the reliability and integrity of the electric system, and the plant's cost effectiveness.

Within seven days following the receipt of a petition, or following its order commencing a proceeding on its own motion, the Commission sets a hearing date within 90 days. Following the hearing, each party may make submittals to the Commission on a time schedule determined by the requirements of the proceeding, but terminating no later than 120 days from the receipt of the petition.

Fig. II-1. The Power Plant Certification Procedure in Florida. Source: SECI



Although it has not been widely understood, the key decision point in the certification process is the Need for Power Determination of the PSC. Whereas the review by DER focuses on environmental impacts and how they can be mitigated, the PSC Need for Power proceeding has become, in effect, the point in the process at which the state either approves or disapproves the proposed project.

There have been instances in which government officials have become involved in siting issues well after the PSC Need for Power order has been given; once they entered in the siting question, the basic question of whether or not a facility would be constructed had already been dealt with. Because of the central importance of the PSC Need for Power order, local officials who anticipate becoming involved in a siting question may wish to be actively involved at this stage of the process. This includes contacting the PSC to stay abreast of hearings and, if desired, to become a formal party to the proceedings.

A "party" is a person or organization that has been recognized as formally taking part in the proceedings. To be granted the status of a party, persons must prove they are substantially affected. Parties are usually represented by an attorney; however, they can represent themselves if they can demonstrate sufficient knowledge of administrative procedure. A copy of a form requesting to be given the status of a legal "party" is included as Fig. IX-4.

Note that in section 403.508 of the law, the county or municipality in whose jurisdiction the plant would be located is allowed to be a party but this status must be requested (See Attachment I). Requesting the status of being a "party" to the proceedings ensures that local officials will receive all documents concerning the case. Note, too, that the statutory requirements for being a party in power plant siting are are different than in the Transmission Line Siting Act. (See Chapter 9.)

3. DER Review for Sufficiency and Completeness

Shortly after receiving an application (or amendment) DER makes a determination regarding the "sufficiency" and "completeness" of the application. If DER's judgment regarding "sufficiency" or "completeness" is contested by the applicant, the hearing officer designated by the Division of Administrative Hearings rules on the issue.

4. Certification Review and Studies

Within 15 days of receiving a power plant site application, the Department of Environmental Regulation is required to furnish copies of the application to the Department of Community Affairs, the Public Service Commission, the appropriate Water Management District and all other reviewing agencies. By law, these first three agencies must review the application and present a preliminary report to DER within 60 days; they must submit a final report within five months. Staff Analysis Reports prepared for power plants certified in recent years are listed above in the Bibliography, Section 4 of Part A.

DER then conducts (or contracts for) a study of the proposed generating facility including the following:

1. Cooling system requirements
2. Construction and operation safeguards
2. Proximity to transportation systems
3. Proximity to navigable waters and other transportation systems
4. Soil and foundation conditions
5. Impact on water supplies
6. Impact on land use
7. Accessibility to transmission lines
8. Environmental impacts, including impacts on air and water quality
9. Technical sufficiency of operational safeguards
10. Impact on public lands and submerged lands
11. Impact on plant and animal life, especially endangered or threatened species.
12. Impact on archeological sites and historic preservation areas.

DER distributes copies of the utility's application to other state agencies, to the hearing officer, to local governments, to libraries near the proposed plant, and to "parties" in the proceedings. In most cases, these applications are several volumes in length, plus several additional volumes of appendices including site selection studies and need for power determination studies.

In addition to these requirements, Ch. 17-17 FAC directs DER to publish notices of forthcoming hearings. These notices must be one-half of a newspaper page in size. A prominent heading and map showing the power plant site is included in the notice. Hearing notices explain how groups, individuals or an agency can become a party to the proceedings, as well as the date and location of the hearing.

5. The Land Use Hearing

Within 90 days of receiving a site certification application, DER must arrange for a public hearing in the county of the proposed site to determine if the project is consistent with existing land uses and zoning ordinances. This proceeding is directed by a hearing officer appointed by the Division of Administrative Hearings. This is a point at which local government planners become involved with the siting procedure, although this hearing is restricted solely to land use questions.

If the site is found not to be in conformance with existing land use and zoning ordinances, the applicant is responsible for applying to have the site rezoned. If the rezoning application is denied, it may be appealed to the Governor and Cabinet. The Governor and Cabinet may override the local government and authorize a variance to the local zoning and land use plans after due notice is given and a public hearing is held.

6. The Certification Hearing

Within ten months of receipt of a complete application, a public hearing is held to discuss the case. The hearing is usually held during working hours, although hearings may continue on into the evening. The location for the hearing is usually a government auditorium or courtroom. Certification hearings have taken as little as one day and as long as twenty-two days.

At the hearing, the utility is required to make a formal presentation on the proposed project. In addition, the expected environmental impacts of the project, requests for variances and other relevant issues are discussed.

The general public is normally given a chance to speak at the end of the proceedings. Speakers are sworn in and are asked to present new evidence or facts which have not been previously brought up by other parties. General comments which simply voice an objection to the project are discouraged. When a number of persons representing the same organization, such as a labor union or a homeowners' association, wish to make the same statement, they are asked to select a representative to present their views and to indicate how many persons are represented.

Since most private citizens will not qualify as experts in a field related to the project, testimony of the general public is taken as "oral communications" rather than expert opinion. Thus the weight the hearing officer will give public testimony is not as great as that afforded to an expert witness. Those persons or organization which have been formally recognized as "parties" to the proceedings can cross-examine a speaker and later may be allowed to challenge or rebut the information provided.

7. Recommended Order of DOAH

Within two weeks after a power plant certification application is received, DER requests the Division of Administrative Hearings (DOAH) of the Florida Department of Administration to assign a "hearing officer" to preside over hearings or disputes in the case. A hearing officer is an impartial arbiter who presides over all legal proceedings connected with the case (other than the PSC's Need for Power hearing and the hearing before the Siting Board).

Within twelve months of the certification hearing, the hearing officer prepares a Recommended Order regarding the environmental and social suitability of the project. This Recommended Order, which is presented to the Siting Board, may recommend that: (1) the utility be granted the certification as applied for; (2) the original site be modified; or (3) the application be denied. (See the Bibliography, Section 4 of Part A of this chapter for examples of Recommended Orders.)

8. The Order of the Governor and Cabinet

The action by the Siting Board to issue or deny certification by approving, rejecting or modifying the recommended order.The Board'sOrder is the final administrative action required to process a power plant site application. Although the Governor and Cabinet, sitting as the Siting Board, have the final authority to deny certification, in actual practice the Siting Board usually adopts the recommendation of the hearing officer.

The Siting Board certification normally includes "Conditions of Certification." In the Conditions of Certification imposed in all power plants certified under the PSA, DER is given the authority to monitor construction of the project and to require the utility to provide information on environmental monitoring, such as the water quality of wells near the plant, air quality and water quality of the body of water used to receive heated water discharged by the plant.

The Conditions of Certification which the Governor and Cabinet may impose are binding, and the site certification is in lieu of any other permit required by any other state or local agencies (meaning that no other regulations or stipulations can be imposed). See the Bibliography for examples of the orders issued by the Board in recent years, along with the Conditions of Certification imposed.

9. Post-Certification Review

In the Conditions of Certification, DER is given the power to monitor environmental conditions at and near the power plant. Consequently, DER reviews and approves construction of the plant, and then monitors environmental quality once the plant is in operation.

C. AGENCY RESPONSIBILITIES

Section 403.508 of the Power Plant Siting Act (PPSA) directs a number of state- and local-government agencies to participate in reviewing power plant site certification applications (See Attachment I). Among the state agencies normally taking part in power plant certification reviews are the Department of Environmental Regulation (DER), the Department of Community Affairs (DCA), the Game and Fresh Water Fish Commission (GFC), and the Department of Natural Resources (DNR). In addition, the Water Management District, the county and the municipality in whose jurisdiction the plant is to be located are also directed by law to participate in the review. The role of each of these and other reviewing agencies is detailed below. For a directory of these agencies, see Attachment IX.

1. The Department of Environmental Regulation

As lead agency in the certification process, DER in essence functions as staff to the Governor and Cabinet sitting as the Siting Board. DER is responsible for coordinating the reviews of state and local agencies, disseminating the application for certification, scheduling hearings, and providing public notices. DER compiles and summarizes the multi-agency review, called the "Certification Review."

From the reports submitted by the state and local-government agencies, and from its own analyses, DER develops a recommendation as to whether or not the project should be certified. DER also makes recommendations about any variances that may be necessary and drafts the Conditions of Certification.

DER investigates the impact of the project on water and air quality, solid and chemical waste generation and disposal, as well as protection of the habitat of wildlife and the protection of other "biological resources."

Once the project is certified, DER (in conjunction with other agencies) reviews construction of the plant to verify compliance with the Conditions of Certification. In addition, a site-specific review for any planned dredging or filling work is made. DER field inspectors monitor the construction and maintenance of the project, and initiate any necessary enforcement procedures that might be necessary.

2. The Department of Community Affairs

The PPSA directs the Department of Community Affairs to prepare a report on the compatibility of the proposed power plant with the state comprehensive plan. As part of this review, DCA examines the proposed power plant to determine if it is in conformity with local zoning ordinances and local land use plans. DCA also considers the effect of the project on local and regional growth and development patterns.

3. Department of Natural Resources

In its comments, the Department of Natural Resources usually examines the impact of the proposed power plant project on state-owned properties such as state parks and recreation areas. DNR serves as staff to the Trustees of the Internal Improvements Trust Fund (i.e., the Governor and Cabinet), which has title to all state-owned lands other than highway rights-of-way.

DNR has responsibility for protecting the manatee. Since manatees seek out warm waters in winter as "refugia," they frequently congregate around the thermal discharge of a power plant. Consequently, DNR considers how best to protect manatees, particularly if the plant were to cease operation during cold months.

4. Water Management Districts

The Water Management District in whose jurisdiction the plant is to be located is required by law to prepare a report on the impact of the project on water resources. This report examines the amount of water to be withdrawn, proposed sources of water, the temperature of discharged water, the quality of water to be discharged, the effects of storing wastes and coal, and so forth. Chapters 4 and 6 of this handbook are designed to help Water Management Districts prepare this report. For a map of the five Water Management Districts of Florida, see Fig. IX-5.

5. Game and Fresh Water Fish Commission

The comments of the Game and Fresh Water Fish Commission (GFC) usually address the impact of the proposed project on fish and wildlife resources. The impact of the plant on threatened or endangered species is considered, as is the impact on game species. Each power plant certification application includes lengthy analyses of the plant and animal species found at the site. In recent siting cases, the GFC report has called attention to such things as the location of eagles' nests, the habitat of the red cockaded woodpecker and the location of nests of sandhill cranes at proposed sites. The GFC also reviews plans of the utility to preserve these species.

6. Other State Agencies

a. Department of Transportation--The Department of Transportation reviews the site certification applications to determine if any associated transmission lines which need to cross highways follow the DOT Utility Accommodation Guide. In addition, DOT looks at other transportation questions, such as railroads that might be run to the plant, or the impact of the plant on harbors and ports.

b. Division of Archives, History and Records Management--The Division of Archives, History and Records Management of the Department of State reviews proposed projects for their impact on archeological and historical sites. In its review, DAHRM examines the construction plans of the utility, and usually conducts an on-site inspection of the area for known or potential sites to be preserved. If an archeological find is located during construction, DAHRM works with the utility to investigate the find, or protect it.

c. Office of the Public Counsel--The Office of the Public Counsel represents rate payers before the Public Service Commission. To date, the Public Counsel has never intervened in a Need for Power Determination proceeding of the PSC, but it is possible that the agency could do this in the future. The Office of the Public Counsel might be able to help private citizens or interest groups becoming involved in a siting case.

d. Governor's Energy Office--Although the Governor's Energy Office has never been a party to a power plant siting case, the GEO has intervened before the PSC regarding conservation goals for electric utilities, an issue closely related to the PSC Need for Power Determination process. The GEO can provide local planners with energy data useful in the Determination of Need process.

7. Local Governments

Local governments are the first avenue of assistance for citizens. For this reason, the Power Plant Siting Act requires the municipality and the county in which the plant is to be built to prepare a report on its impact. The local governments' reports should identify any variances from zoning ordinances or land use plans which might be necessary; if the local government objects to granting a variance, this must also be mentioned.

Under §403.508(5) of the PPSA, local governments in whose jurisdiction the proposed plant is to be located are automatically "parties" to the siting case, unless they waive this right (See Attachment I). The concerns of local governments are addressed in the report of the Department of Community Affairs.

8. Regional Planning Councils

The Power Plant Siting Act does not specifically mention Regional Planning Councils (RPCs), but in practice they RPCs are routinely asked to participate in the review of applications. The areas that RPCs comment on are likely to include the relationship of the proposed plant to comprehensive plans in the region and conflicting issues between local governments. RPCs are expected to provide assistance to local governments in reviewing a proposed power plant. (See Fig. IX-6 for a map showing the eleven RPC districts of Florida.)

9. Federal Agencies

Strictly speaking, federal agencies are not a formal part of Florida's power plant siting process. However, a number of federal agencies are routinely involved in power plant siting in all states under federal law. Among the federal agencies most frequently involved in siting cases are the Environmental Protection Agency (EPA), the Army Corps of Engineers (COE), the Fish and Wildlife Service (FWS), and the Federal Aviation Administration. For a directory of these agencies, see Attachment IX.

a. Environmental Protection Agency--EPA coordinates the preparation of Environmental Impact Statements under the National Environmental Policy Act (NEPA). Not all new power plants are reviewed through the EIS process, though plants which must receive a National Pollutant Elimination System (NPDES) permit are required to have an EIS. In addition to issuing NPDES permits, EPA also regulates effluent discharges to the atmosphere under the Clean Air Act. For examples of EISs and draft EISs prepared for recent Florida power plants, see the Bibliography, Section 4 of Part A.

EPA has responsibility for the Prevention of Significant Deterioration (PSD) air quality regulations issued under the Clean Air Act, as described in Chapter 5 of this handbook. Administration of the PSD program in Florida has been delegated to the Department of Environmental Regulation.

Under the Resource Conservation Recovery Act, EPA has responsibility for regulation of the generation, transportation, storage and disposal of hazardous wastes. And under section 316(b) of the Clean Water Act, EPA regulates cooling water intake structures.

b. Army Corps of Engineers--The Army Corps of Engineers considers the impact of a proposed plant on floodplains and wetlands under Executive Orders 11988 and 11990. The COE issues dredge-and-fill permits in navigable waters, which are often required for intake and discharge structures of power plants.

c. Fish and Wildlife Service--The Fish and Wildlife Service of the U. S. Department of Interior establishes regulations for the protection of species of plants and animals designated as "rare, endangered or threatened" under the Endangered Species Act of 1973. FWS officials review draft Environmental Impact Statements, which invariably contain large amounts of data on the wildlife found at a proposed site.

d. Other Federal Agencies

o The Rural Electrification Administration (REA): must approve loans for rural electric cooperative utilities

o The Department of Agriculture (DOA): Considers important farmland and forest land under USDA Memorandum No. 1827 on Land Use Policy

o The Forest Service of the Department of Agriculture considers impacts on federally-owned lands, such as national parks, wildlife refuges and wilderness areas.

o The National Oceanographic and Atmospheric Administration (NOAA): considers the consistency of a proposed plant with the state's coastal zone management plan under the Coastal Zone Management Act of 1972. In Florida, DER make the consistency determin-ation, but it can be appealed to NOAA. The Office of the Governor has issued a Coastal Consistency Manual (See Bibliography).

o The Federal Aviation Administration (FAA): issues permits to construct tall structures such as power plant stacks and cooling towers.

D. OTHER SITING LEGISLATION

Although power plant siting in Florida is governed primarily by the Power Plant Siting Act, there are other statutes that apply to the certification procedure. This section provides a brief review of the Ten-Year Site Plan Act, other applicable state legislation, and provides a list of sources on analogous siting legislation in other states.

1. The Ten-Year Site Plan Act

Section 23.0190, Florida Statutes, requires each major electric utility to prepare and submit to DCA a ten-year site plan (TYSP) not less than every two years. This report is to estimate the utility's power generating needs and to identify the general location of proposed new power plant sites. For a copy of the statute, see Attachment II.

Under the provisions of the act, DCA classifies each TYSP as either "suitable" or "unsuitable." These findings are to be submitted to the Florida Department of Environmental Regulation for consideration at any subsequent certification hearings.

In preparing its review, DCA considers comments from local governments within whose jurisdiction a power plant is proposed in the TYSP. To encourage comments from local governments, DCA routinely distributes the applicable TYSPs to affected local governments for review. Therefore, the TYSP is a vehicle for informing local governments of a proposed power plant well before the utility may apply for certification.

It should be noted that comments on a site mentioned in a TYSP in no way take the place of comments a local government may want to make during the actual certification process. For more information about this program, or for copies of Ten-Year Site Plans of utilities, contact:

Power Plant Siting Program
Bureau of Land and Water Management
Department of Community Affairs
2751 Executive Center Circle East
Tallahassee, FL 32301
tel. 904/488-9210.

2. Other Applicable State Legislation

Although the Power Plant Siting Act is unquestionably the main law in Florida which governs the siting of power plants, other state statutes come into play from time to time, depending both on the location of the proposed plant and on its features. Some of these statutes are listed in Table II-2. For further information on additional state legislation, these two publications are recommended:

1. Department of Environmental Regulation. A Manual of State Regulatory and Review Procedures for Land Development in Florida. (Tallahassee, FL: Dept. of Administration, Bureau of Comprehensive Planning, 1979).

2. Office of the Governor. Coastal Consistency Manual. (Tallahassee, FL: Office of the Governor, 1983).

Table II-2: Statuatory Authorites of Florida's Coastal Management Program. Source: Second Interim Report of ELMS II Committee (Dec., 1983).

	LEGAL AUTHORITY	LEGAL AUTHORITY DESCRIPTION	ADMINISTERING AGENCY*
1.	Chapter 23, F.S.	State Comprehensive Planning, Power Plant Site Plans	OPB, DCA
2.	Chapter 119, F.S.	Public Records	DOS
3.	Chapter 120, F.S.	Administrative Procedures	APC, DOAH
4.	Chapter 160, F.S.	Regional Planning Councils	RPC
5.	Chapter 161, F.S.	Coastal Construction	DNR
6.	Chapter 252, F.S.	Disaster Preparedness	DCA
7.	Chapter 253, F.S.	Sale, Lease, or Other Conveyance and Dredging and Filling in Submerged Lands and Wetlands	TIITF; DNR DER
8.	Chapter 258, F.S.	Outdoor Recreation and Conservation	DNR
9.	Chapter 259, F.S.	Outdoor Recreation and Conservation	DNR
10.	Chapter 260, F.S.	Outdoor Recreation and Conservation	DNR
11.	Chapter 267, F.S.	Historic Preservation	DOS
12.	Chapter 288, F.S.	Economic Development/ Industrial Siting	DOC, DER
13.	Chapter 315, F.S.	Port Facilities Financing	Port Authorities
14.	Chapter 334, F.S.	Public Transportation	DOT
15.	Chapter 366, F.S.	Public Utilities	PSC
16.	Chapter 370, F.S.	Living Resources (marine)	DNR
17.	Chapter 372, F.S.	Living Resources (freshwater)	GFWFC
18.	Chapter 373, F.S.	Withdrawal, Diversion, Storage, and Consumption of Water; Save Our Rivers	DER, WMD
19.	Chapter 375, F.S.	Outdoor Recreation and Conservation	DNR
20.	Chapter 376, F.S.	Pollutant Spill Prevention and Control; Ports and Waterways	DNR
21.	Chapter 377, F.S.	Oil and Gas Production	DNR
22.	Chapter 380, F.S.	Developments of Regional Impact and Areas of Critical State Concern, Coastal Management	DCA, DER
23.	Chapter 388, F.S.	Arthropod Control	DHRS
24.	Chapter 403, F.S.	Sources of Water Pollution; Sources of Air Pollution; Power Plants; Dredging and Filling; Control of Hazardous Wastes; Resource Recovery; Ports and Waterways	DER
25.	Chapter 582, F.S.	Soil and Water Conservation	DACS

SOURCE: The Florida Coastal Management Program's Final Environmental Statement, August 1981.

*KEY:

APC - Administrative Procedures Committee
DACS - Dept of Agriculture and Consumer Services
DCA - Dept of Community Affairs
DER - Dept of Environmental Regulation
DHRS - Dept of Health & Rehabilitative Services
DNR - Dept of Natural Resources
DOAH - Division of Administrative Hearings
DOC - Dept of Commerce
DOS - Department of State
DOT - Department of Transportation
GFWFC - Game & Fresh Water Fish Commission
OPB - Office of Planning and Budgeting
PSC - Public Service Commission
RPC - Regional Planning Council
TIITF - Trustees of the Internal Improvement Trust Fund
WMD - Water Management District

3. Siting Procedures in Other States

Power plant siting in Florida can be compared with analogous procedures. For those who want to study the power plant siting legislation and regulations of other states, the following sources may be helpful:

GENERAL

Crillo, R. R. et al. An Evaluation of Regional Trends in Power Plant Siting and Energy Transport. (Argonne, IL: Argonne National Laboratory, July, 1977). Prepared for EPA and ERDA. 274 pp. NTIS Nr. ANL/AA-7

National Governor's Assn. State Perspectives on Energy Facility Siting. (Washington, D.C.: NGA).

Southern Governor's Conference. State and Regional Aspects of Major Energy Facility Siting. (Atlanta, GA: Southern Interstate Nuclear Board, 1977).

Stevens, David. State Perspectives on Energy Facility Siting: Current State Practices. (Washington, D. C.: National Governor's Assn., Dec., 1978).

U. S. Nuclear Regulatory Commission. Improving Regulatory Effectiveness in Federal/State Siting Actions. (Washington, D. C.: U. S. Nuclear Regulatory Commission, May, 1977).

CALIFORNIA

California Energy Commission. Power Plant Siting Policy Paper. (Sacramento, CA: Calif. Energy Commission, Nov., 1978).

MARYLAND

Rogers, John et al. Maryland Major Facilities Study: Executive Summary. (Annapolis, MD: Maryland Dept. of Natural Resources, January, 1978). Avail. ILL; Texas A&M Univ. at Galveston, Call Nr. TJ 163.25 U6R6; NTIS Nr. PB-296-821

NEW ENGLAND

New England Rivers Basin Commission. Power Plant Siting Study: Compendium of Staff Reports. (U. S. Geological Survey, Resource Planning Analysis Office, November, 1980).

NEW JERSEY

Rogers, Golden, Halpern. New Jersey Facility Development Potential Study. (Trenton, NJ: New Jersey Dept.of Environmental Protection, Div. of Coastal Resources, Sept., 1981).

NEW YORK

Cronin, Philip and Turner, Scott. "Article VIII of the Public Service Law -- The Brave New World of Power Plant Siting in New York: A Critique and Suggestion for an Alternative Approach." Albany Law Review. (Summer, 1978).

OHIO

Winter, John and Conner, David. Power Plant Siting. (New York: Van Nostrand Reinhold, 1978). 197 pp.

CHAPTER 3

POWER PLANT SITING METHODOLOGY

CHAPTER 3

POWER PLANT SITING METHODOLOGIES

The main question likely to be faced by a local or regional planner in a power plant siting question is whether or not the site requested for certification by the applicant utility is indeed the best available. As explained in Chapter 2, when the Department of Environmental Regulation receives a Power Plant Site Application (PPSA), local-governments and regional planning agenices are asked to evalute the application. As part of this review, planners will need to examine the site selection methodology appearing in the application, and to comment on the appropriateness of the site. This chapter provides an overview of selected case studies of the methodologies used in PPSAs in Florida in recent years, and summarizes research findings of studies which have examined methodologies used by a variety of electric utilities.

A. POWER PLANT SITING: FLORIDA CASE STUDIES

1. Power Plant Site Selection Studies

After a decision is made to construct a power plant, the first step in the process of certifying the plant is to evaluate potential sites. The sites considered in seven recent power plant site selection studies are detailed below. Maps showing the location of all seriously considered sites are reproduced here because there is the possibility that the same sites might be considered again in the future.The Bibliography, Section 5, provides the full bibliographical citation for each of these publications.

a. The JEA/FPL St. Johns River Power Park -- The site selection study examined six potential sites for the proposed power plant, all of which were located along the St. Johns River. Three were in Clay County, one site was in St. Johns County , and two were in Duval County. (See Fig.III-1)

b. OUC's Stanton 1 -- An OUC study published in 1980 narrowed the search area to five potential sites, four in Orange county, and one in Volusia County on the St. Johns River at Lake Harney, near Geneva. (See Fig. III-2).

c. SECI's Seminole Units 1 and 2 -- A study conducted by Stanley Consultants for SECI, published in April of 1977, examined eleven potential sites. As shown in Fig. III-3, these sites were in the counties of Suwannee, Gilchrist, Bradford, Madison, Citrus, Sumter, Charlotte and Putnam (the county selected for the site to be certified).

d. 1978 FPC Study -- In 1978 a study conducted by Woodward-Clyde Consultants for FPC examined eight potential sites. As seen in Fig. III-4, the study examined sites in the counties of Gulf, Suwannee, Volusia, Seminole, Orange and Osceola. Of these, the Gulf County site was declared the "preferred" site.

e. FPC's Crystal River Units 4 and 5 -- In 1977 when Florida Power Corp. applied for certification of two additional coal-fired units at the Crystal River power plant in Citrus County, Chapter 8 of the Power Plant Site Application (PPSA) considered eleven potential sites. As seen in Fig. II-5, the application provided information on sites in the counties of Gulf, Volusia, Polk, Wakulla, Levy, Pasco, Putnam and Citrus. (See Fig. III-5)

Fig. III-1. Location of Preferred Sites for the St. Johns River Power Park. Source: Appendix W of Volume II of the JEA/FPL SJRPP EIS Technical Reference Document.

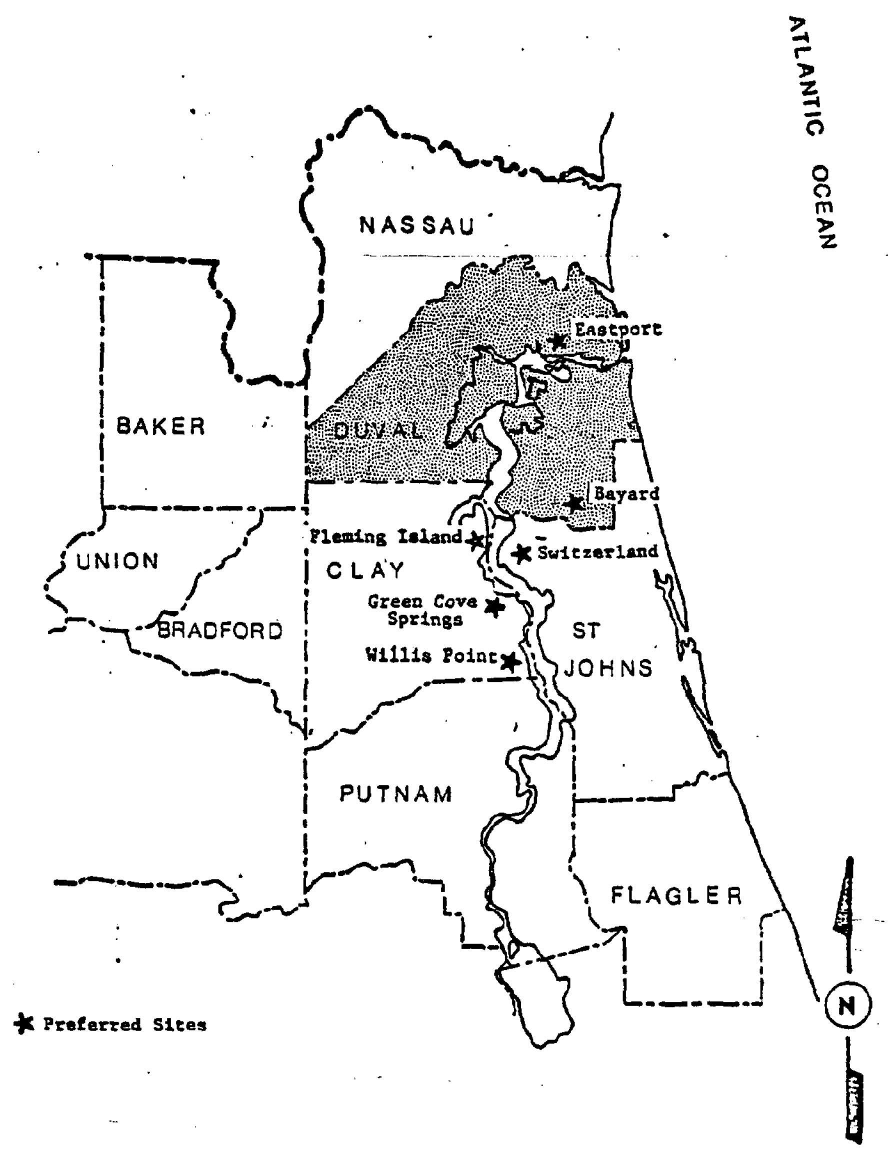


Fig. III-2: Five Potential Sites for OUC's Stanton 1 Plant.
Source: OUC's Site Selection Study, Volume I (Jan., 1980).

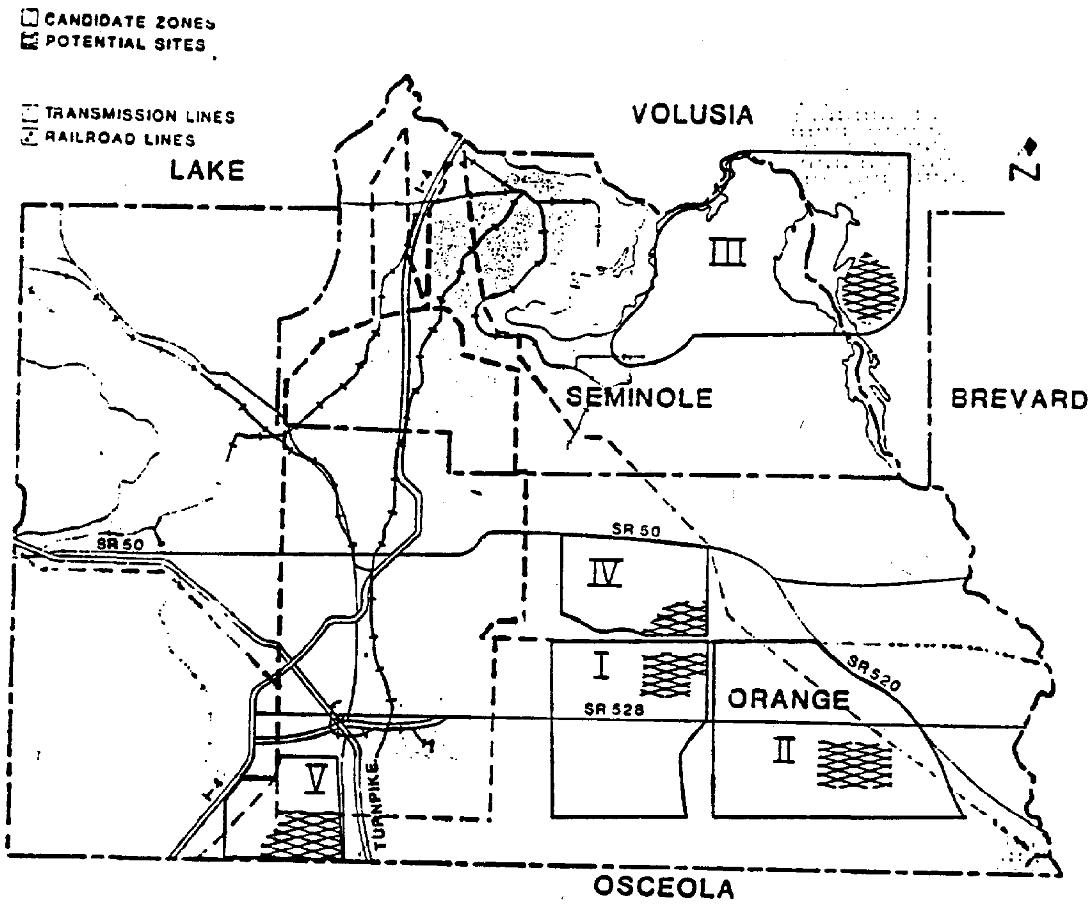


Fig. III-3: Search Area and Locations of Eleven Proposed Sites for a Coal-Fired Power Plant for Seminole Electric Cooperative. Source: Stanley Consultants (April, 1977).

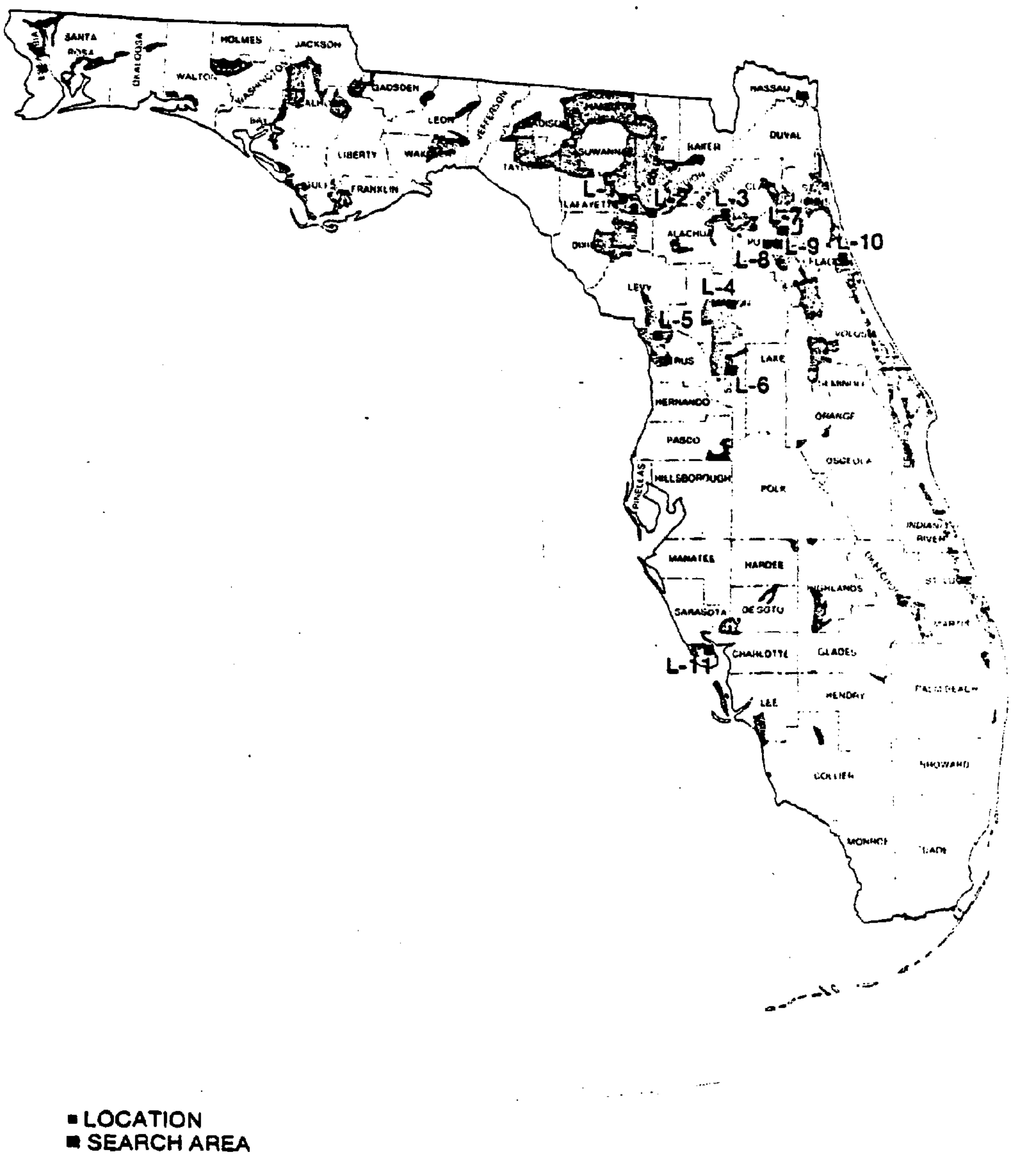


Fig. III-4: Locations of Eight Proposed Sites for Coal-Fired Power Plants for the Florida Power Corporation. Source: Woodward-Clyde Consultants (October, 1978).

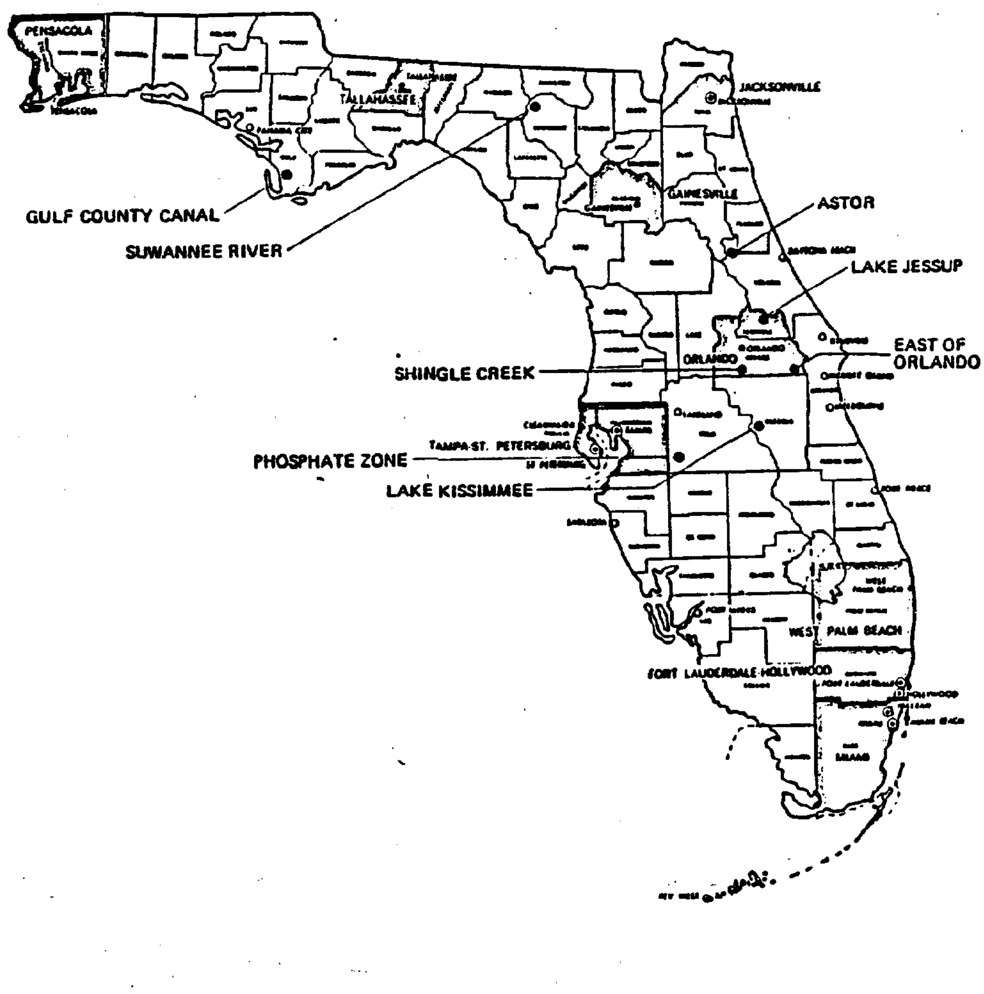
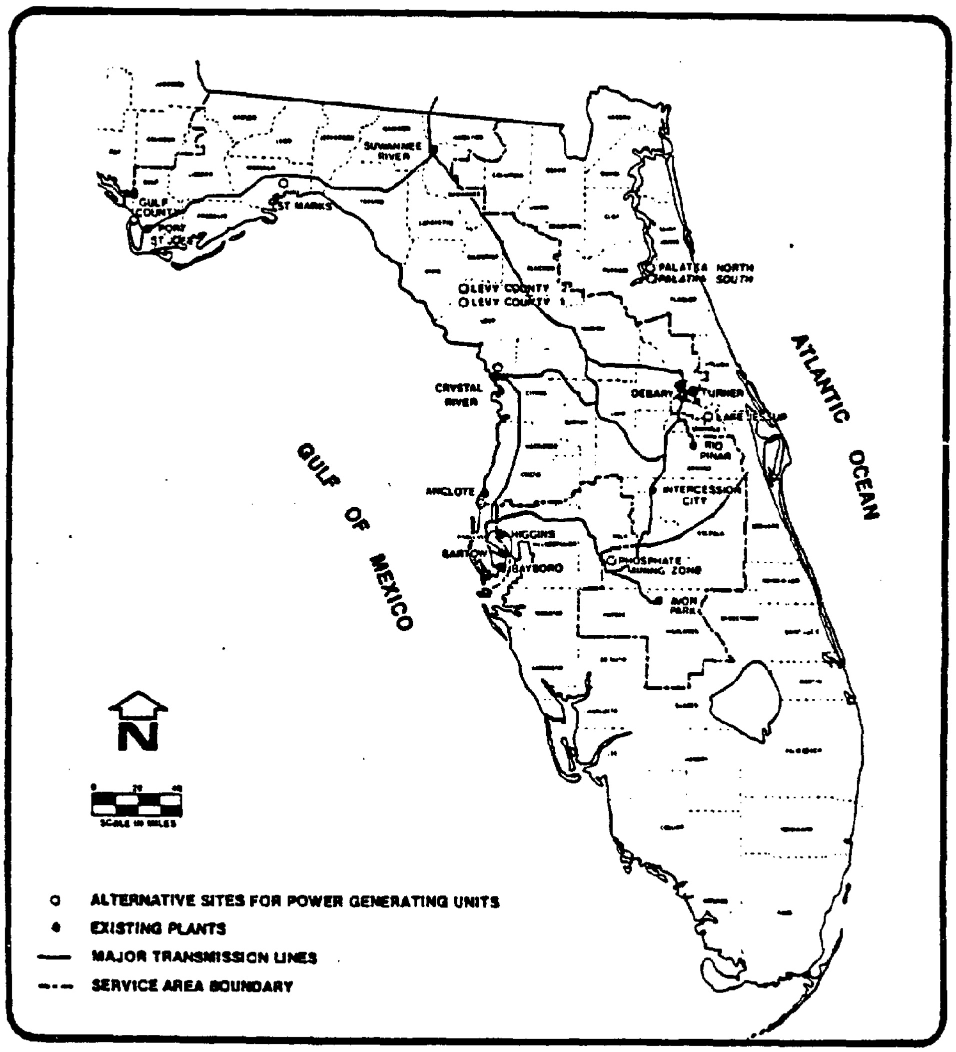


Fig. III-5: Eleven Alternative Sites for Power Generating Units for the Florida Power Corporation. Source: Chapter 8 of Volume II of the Technical Support Documents for FPC's Crystal River Units 4 and 5 (July, 1980).



f. TECO's Proposed MacInnes Site -- The 1983 Ten-Year Site Plan of Tampa Electric Co. named 19 potential sites for the proposed MacInnes coal-fired power plant. As seen in Fig. III-6, four of these sites were in Hardee County, along the Peace River, eight were in Polk County, two were in Manatee County, just south of the Hillsborough County line, and four were located in Hillsborough County. Although the utility submitted a "Notice of Intent" to submit an application for the so-called "MacInnes Site" (MA-1), located on Tampa Bay at the Hillsborough-Manatee county line, north of Bradenton, in 1982, the 1984 Ten-Year Site Plan does not include the MacInnes site.

g. FPL's Martin Expansion -- Florida Power and Light has not formally applied for certification of new coal-fired units at the Martin plant in western Martin County, on Lake Okeechobee. But the utility has published a study entitled Coal Project which examines nine potential sites for a new coal-fired plant. Of these nine, one site is in Osceola county, two in Highland County, two in Okeechobee County, one in St. Lucie county, and three in Martin county. The study recommends constructing the new coal-fired units at the site of the present Martin County plant on Lake Okeechobee. (See Fig. III-7)

2. Power Plant Site Selection Criteria in Florida

To select a proposed power plant site, most utilities (or their consultant) conduct a study in which a large search area is first considered. Potential sites are then gradually reduced to a few acceptable locations which are subsequently examined in greater detail. There are, however, no state regulations or standards for evaluating the strengths and weaknesses of potential sites; each utility uses different criteria for evaluating candidate sites.

Fig. III-6: Nineteen Potential Sites for a Coal-Fired Power Plant for Tampa Electric Co. Source: TECO Ten-Year Site Plan (1983). Note: Site not listed in TECO's 1984 Ten-Year Site Plan.

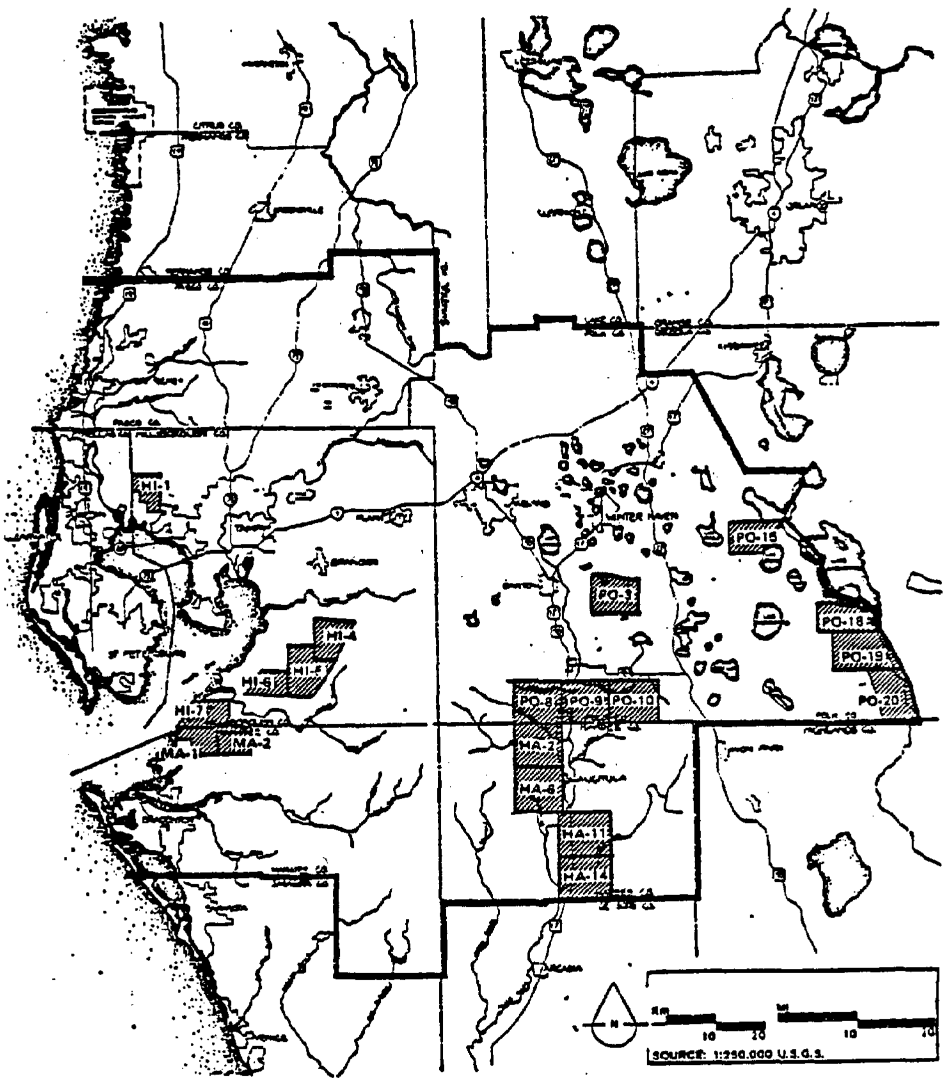
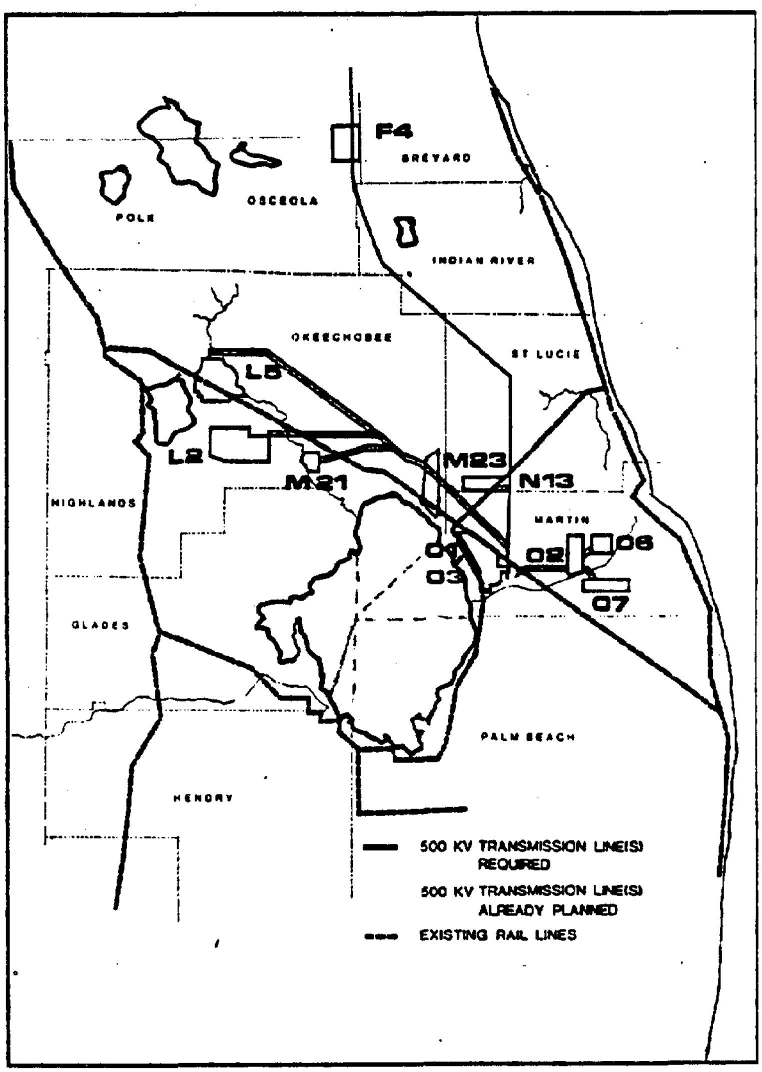


Fig. III-7. Sites Examined by Florida Power and Light for a Future Coal-Fired Power Plant. Source: FPL's <u>Coal Project</u>.



Because many planners will want to examine the criteria used by the applicant utility in a site certification application, the evaluation criteria used in six recent power plant site selection studies are presented below. This reviews shows clearly that evaluation criteria vary widely from one utility to another.

a. OUC's Stanton 1 -- The Site Selection Study conducted by Orlando Utilities Commission for the Stanton plant included a weighting scale based on 100 points. (See Table III-1). As seen in Table III-2, the five final candidate sites were rated in the study using varying weights, a procedure known as "sensitivity analysis."

b. FPL's Coal Project -- The FPL publication Coal Project includes a rating system of 27 categories. As seen in Table III-3, each of the criteria was rated on a scale of 1 - 5, and each received a weight of 1 - 5. Out of a potential of 390 points that any one site could receive, the site recommended by the utility--the current Martin plant--received a total of 354 points.

According to the utility, the ratings were conducted by "consultants with expertise in fields related to each criterion." Based on the information provided by the utility, it would be impossible to replicate the findings of the study, although the utility did provide the results of a sensitivity analysis in which different sets of weights were assigned to each category.

c. SECI's Seminole Units 1 and 2 -- Appendix K of the Site Certification Application of Seminole Electric Cooperative for Seminole Units 1 and 2 is the Site Selection study conducted for the utility by Stanley Consultants. This study includes a lengthy rating system called "Evaluation Criteria." As seen in Table III-4, this rating system is based on a scale of 1000 points. Because no quantitative information is provided, replication of the scoring is impossible.

Table III-1: Environmental Evaluation Criteria Used by the Orlando Utilities Commission in Rating Candidate Sites for a Coal-Fired Power Plant. Source: OUC Site Selection Study for Coal-Fired Power Plant, Volume I (Jan., 1980).

		Site 1C Lake Harney S. E.		Site 2A Shingle Creek		Site 3A South-east Orange		Site 19A Econlock-hatchee North		Site 20A Econlock-hatchee South	
	Weight	Raw No.	Adj. No.	Raw No.	Adj. No.	Raw No.	Adj. No.	Raw No.	Adj. No.	Raw No.	Adj. No.
Technical/ Economic	100	98	98	100	100	97.6	97.6	99.1	99.1	99.4	99.4
Hydrology											
Water Quality	5	64	3.2	88.8	4.4	100	5	89.6	4.5	95.6	4.8
Air Quality	15	40	6	40	6	80	12	100	15	100	15
Land Use (Future)	5	100	5	25	1.2	100	5	100	5	100	5
Ecology											
Terrestrial Ecosystems	25	100	25	60	15	80	20	60	15	80	20
Aquatic Exosystems	25	80	20	60	15	80	20	40	10	80	20
General Site Acceptability	25	100	25	20	5	100	25	60	15	100	25
Total Environmental	100	-	84.2	-	46.6	-	87.0	-	64.5	-	89.8

Table III-2: Weighting Scale Used by OUC to Evaluate Five Potential Sites for the Stanton 1 Plant Showing Sensitivity Analyses. Source: OUC Site Selection Study for Coal-Fired Plant, Volume I (Jan., 1980).

	Lake Harney Southeast		Shingle Creek		Southeast Orange		Econlock-hatchee-N.		(Certified Site) Econlock-hatchee-S.	
	Adj. No.	Final No.	Adj. No.	Final No.	Adj. No.	Final No.	Adj. No.	Final No.	Adj. No.	Final No.
50% Technical/ Economic	98	49	100	50	97.6	48.8	99.1	49.6	99.4	49.7
50% Environmental	84.2	42.1	46.6	23.3	87.0	43.5	64.5	32.2	89.8	44.9
50/50 Total	-	91.1	-	73.3	-	92.3	-	81.8	-	94.6
45% Technical/ Economic	98	44.1	100	45	97.6	43.9	99.1	44.6	99.4	44.7
55% Environmental	84.2	46.3	46.6	25.6	87.0	47.8	64.5	35.5	89.8	49.4
45/55 Total	-	90.4	-	70.6	-	91.7	-	80.1	-	94.1
40% Technical/ Economic	98	39.2	100	40	97.6	39.0	99.1	39.6	99.4	39.8
60% Environmental	84.2	50.5	46.6	28.0	87.0	52.2	64.5	38.7	89.8	53.9
40/60 Total	-	89.7	-	68.0	-	91.2	-	78.3	-	93.7

Table III-3: Power Plant Siting Criteria Used by Florida Power and Light in the Study Coal Project. Source: FPL's Coal Project.

ENVIRONMENTAL SITING CRITERIA	CRITERIA WEIGHTS	ALTERNATIVE SITES — NUMERICAL RATINGS									
		F-4	L-2	L-5	M-21	M-33	M-13	O-1/ O-3	O-2	O-6	O-7
1 Land Availability	5	3	4	1	3	2	4	5	2	1	1
2 Land Use Compatibility	4	4	3	2	3	2	2	5	3	3	3
3 Cooling Water Supply	5	1	5	5	5	5	[illegible]	5	4	5	4
4 Cooling Options Available	3	4	4	4	4	4	4	4	4	4	4
5 Process Water	3	5	5	5	5	4	5	5	5	5	5
6 Surface Water Quality	4	3	5	5	4	4	5	3	3	3	3
7 Ground Water Quality	3	2	2	2	2	2	3	3	2	1	3
8 Transmission Routing	2	[illegible]	2	2	2	3	3	5	4	3	3
9 Fuel Delivery	1	4	3	3	3	3	4	4	4	4	4
10 Rail Accessibility	2	1	3	5	4	3	4	5	3	2	3
11 Highway Accessibility	1	1	3	4	4	4	1	5	4	4	3
12 Port Accessibility	1	1	2	2	2	2	2	2	2	1	2
13 Terrestrial Biology	3	3	5	4	2	3	2	5	3	3	5
14 Aquatic Biology	4	1	3	3	2	2	4	3	4	2	3
15 Rare & Endangered Species	4	2	3	2	1	3	1	5	5	2	4
16 Air Quality – SO_2	5	3	3	3	3	4	5	5	5	5	5
17 Air Quality – Particulates	5	3	3	3	3	4	5	5	5	5	5
18 Air Quality – Other	4	3	3	3	3	4	4	4	3	3	3
19 Noise	2	4	4	2	2	2	2	4	4	1	2
20 Community Impact	3	4	3	3	4	4	4	5	5	5	5
21 Regional Economics	2	3	4	4	4	4	4	5	4	5	5
22 System Compatibility	2	2	2	2	2	4	4	5	4	4	4
23 Multiple Use Potential	1	2	5	4	3	4	4	4	4	3	4
24 Aesthetics	1	5	4	2	3	3	5	5	2	3	2
25 Archaeological/Historical	1	4	3	3	3	3	2	5	4	4	4
26 Site Preparation	5	3	3	2	1	2	2	5	2	4	3
27 Construction Activities	2	3	4	2	2	3	3	5	3	3	4
TOTAL SITE SCORES*		216	273	238	228	257	280	354	283	261	281

*Sums of the *PRODUCTS* of each numerical rating for each site and the associated criteria weight, *NOT* the sums of the columns of ratings alone.

Table III-4: Evaluation Criteria Used by Seminole Electric Cooperative in the Site Selection Process for Seminole Units 1 and 2. Source: Appendix K, Volume III, of the SECI PPSA for Seminole Units 1 and 2.

Criterion		Points
I.	WATER (250 pts)	
	A. Water Quantity and Reliability	140
	B. Water Quality	30
	C. Water Accessibility	80
II.	TRANSPORTATION (250 pts)	
	A. Mode (Rail and Water)	60
	B. Accessibility	100
	C. Capacity	90
III.	TRANSMISSION (150 pts)	
	A. Interconnections	30
	B. System Capacity	40
	C. Routing and Sizing	80
IV.	ENVIRONMENTAL (350 pts)	
	A. Emissions (SOx, NOx)	70
	B. Physical (topography, geology)	100
	C. Ecology (botany, zoology)	100
	D. Socio-Economic Factors (taxation, housing, employment)	30
	E. Land Use	50
	GRAND TOTAL	1000

d. FPC's Crystal River 4 and 5 -- According to the site certification application submitted by Florida Power Corp. for Crystal River Units 4 and 5, 13 sites were rated according to 16 criteria. Although the application provides a short narrative description of each potential site, and provides a brief review of the economic cost factors of each site, no quantitative rating of the competing sites is provided in the application.

e. JEA/FPL St. Johns River Power Park -- Of all the site evaluation studies contained in certification studies in recent years, the evaluation methodology used in the JEA/FPL St. Johns River Power Park application, as presented in the PPSA, is the most quantitative and the most replicable. The study provides detailed information regarding the criteria to be used in evaluating sites and provides the quantitative scoring for each candidate site.

As seen in Table III-5, the FPL/JEA study, conducted by United Engineers and Constructors, Inc., included detailed site cost estimates for each candidate site, as well as quantified environmental costs. Compared to the narrative approach taken by some other utilities, this study was far more sophisticated. Public dissatisfaction with the highest-ranked site led to selection of the "Eastport site"--ranked fifth out of six.

3. Power Plant Siting Methodologies

The power plant siting methodologies used in these six prominent Florida cases can be compared with the literature on the subject developed across the nation. Some of the more noteworthy studies of power plant siting methodology are provided in the Bibliography, Section 5, below.

Table III-5: Site Selection Criteria Used in the Siting of the JEA/FPL St. Johns River Power Park. Source: Appendix W, JEA/FPL SJRPP EIS Technical Reference Document.

TECHNICAL/ENVIRONMENTAL CONSIDERATION	Site: Willis Point	Walkill	Bayard	Eastport	Thomas Creek	Baldwin
Air Quality - Particulates	A	A	A	A	A	A
Air Quality - Short term NO_2	A	A	B	B	B	B
Air Quality - SO_2 Ambient Compliance(1)	A	A	A	B	A	A
Air Quality - SO_2 Prevention Sig. Det.	A	A	A	C	C	C
Land Use - Onsite	A	A	B	C	B	B
Land Use - Cooling Makeup Piping	A	A	C	A	C	C
Land Use - Coal Conveyor/Barge Fac.	A	A	C	A	C	C
Saltwater Cooling Towers	A	A	A	B	B	B
Total of A Ratings	8	8	4	3	2	2
Total of B Ratings	0	0	2	3	3	3
Total of C Ratings	0	0	2	2	3	3

Key to Ratings:

A - Little to No Potential for Technical or Environmental Problem that Could Result in Licensing Delay
B - Low to Moderate Potential for Technical or Environmental Problem that Could Result in Licensing Delay
C - Moderate to High Potential for Technical or Environmental Problem that Could Result in Licensing Deloy

Note:
(1) Assuming new taller stacks are constructed for the JEA Southside and Kennedy Stations

Table III-5 (Cont'd)

COST PARAMETER	Site: Willis Point	Walkill	Bayard	Eastport	Thomas Creek	Baldwin
Land Rights and Costs	2.1	8.5	6.1	20.4	6.4	6.4
Geology/Foundation Penalty	0.2	0.2	0.0	0.0	0.5	0.0
Makeup Pipe Installations	1.9	3.5	12.7	2.0	35.4	56.7
Makeup Pipe Equipment	0.1	0.1	0.1	0.1	0.4	0.9
Makeup Pumping Energy	1.2	0.9	2.8	1.4	8.5	17.1
Intake/Discharge Earthwork	3.6	0.0	3.6	0.0	0.0	0.0
Railroad Spur/Relocation	0.0	0.0	0.0	1.0	0.0	0.0
Road Extension/Relocation	0.2	0.6	0.0	0.0	0.2	0.0
Transmission Construction	42.4	33.2	38.2	59.7	34.8	28.3
Transmission Losses	0.0	0.0	0.0	86.8	43.4	43.4
Saltwater Cooling	0.0	0.0	0.0	1.9	1.9	1.9
Air Quality Modifications - Class I PSD Operating	0.0	0.0	0.0	54.1	54.1	54.1
Air Quality Modifications - Class I PSD Investments	0.0	0.0	0.0	3.0	3.0	3.0
Total without Barge(1)	51.7	47.0	63.5	230.4	188.6	211.8
Differential Over Base	4.7	Base	16.5	183.4	141.6	164.8
Barge Unloading Facility	13.4	13.4	13.4	13.4	13.4	13.4
Coal Conveyor(2)	2.5	4.8	17.2	2.1	36.5	58.4
Total with Barge(1)	67.6	65.2	94.1	245.9	238.5	283.6
Differential Over Base	2.4	Base	28.9	180.7	173.3	218.4

(1) Fuel delivery to the Bayard site may require the use of an additional rail carrier. This was previously estimated to add a $33 million dollar cost to the total site-related cost. This additional cost is a gross estimate and is subject to future negotiations. It is not included in the tabulation.

(2) Represents construction costs only since the conveyor is planned for backup fuel supply usage.

Probably the most intensive study of power plant siting methodologies was An Assessment of Nuclear Power Plant Siting Methodologies, published in 1981 by the Brookhaven National Laboratory for the Nuclear Regulatory Commission. While this and other BNL studies focus on siting procedures for nuclear power plants, the conclusions of the studies appear to be applicable to siting coal-fired power plants in Florida.

These Brookhaven studies evaluated the siting methodologies employed in 48 major power plant siting cases in the 1970s. The researchers tried to replicate the conclusions of the utility site selection processes, but found a wide variance among weights assigned to different factors, variances that depended on the personal discretion of the people making the evaluation. To make the site selection process more reliable, the study recommends that any methodology used by a utility meet the following criteria:

--The methodology should allow for careful, consistent, and well-documented examination of all factors, tangible and intangible. Important issues and tradeoffs among different factors should be considered explicitly. Decisions should reflect as accurately as possible the personal values of decision makers.

--Methods should generate and preserve information about impacts of different sites and tradeoffs among them.

--Methods should allow for input by more than one decision maker, including nontechnical members of the general public. Procedures should be understandable and not difficult to use. Implications of different personal values for siting considerations should be easy to determine. (See the study by Duczik in the Bibliography below on this point.)

Based on these conclusions, the Brookhaven study provides a checklist of questions that planners can use in reviewing the methodology employed by a utility in its site certification application. This checklist is included as Table III-6.

Table III-6: Checklist for Planners Reviewing Power Plant Siting Methodologies. Source: Rowe et al (BNL, 1981).

REGION OF INTEREST CHECKLIST

I. How is region of interest defined (Section 6.2)?

- A. Service Area?
- B. If less than service area, by what criteria is the region reduced?
  1. Nondiscretionary?
  2. Discretionary? Can a reasonable case be made that these criteria are of importance so great that it is not possible for other characteristics to override them?
- C. If this stage is bypassed by substitution of results of a previous study, does that study meet current requirements?

REGIONAL SCREENING CHECKLIST

I. Exclusionary Screening (Sections 2.5.1.1 and 4).

- A. Are exclusion criteria nondiscretionary?
- B. If not, are discretionary criteria of highest importance?
  1. Avoiding important local political or environmental problems?
  2. Avoiding other problems of local importance as demonstrated by previous siting attempts?
- C. Is there any logic behind levels of discretionary criteria or are they set arbitrarily at levels established by historical precedent?
- D. Are discretionary exclusion criteria established loosely at levels that allow for uncertainty?
- E. Are discretionary exclusion criteria cost related?
  1. Does the report specify how much money is involved (expressed as proportion of total cost and as unit cost of electricity)? Is the cost increase in fact large?
  2. Is there anything special about excluded areas that might make sites there worth the extra cost?

II. Comparison Screening (Weighting Summation) (Sections 2.5.2.1, 2.5.2.4, and 4).

- A. Comparison attributes must necessarily be discretionary.
- B. Do the attributes meet requirements for independence, clarity of definition, and quantifiability required of the Weighting Summation decision rule?
- C. What are the bases for converting attribute levels to subjective value estimates?
- D. What weighting method is used (Sections 2.6, 4, and 5)?
  1. Does the report specify whose weights are represented?
  2. Is the weighting method described? Is it a standard form?
  3. Does the method ensure ratio-scaled weights?
  4. If not, is its use justified?
     - a. Is there awareness of problems related to implied weights arising from misapplication of methods.
- E. Is the decision rule correctly applied (Sections 2.5, 4, and 5)?
  1. Weighting Summation is the only commonly used method for screening. Are attribute values multiplied by weights and added? If not, why not?
- F. Does the cutoff for inclusion among candidate areas have sufficient leeway to allow for uncertainty? Are any potential candidate areas excluded for reasons not included in the analysis? If so, are the exclusions justified?

III. Is this stage bypassed in deference to results of a previous study?

- A. Is the study recent enough so that data are up to date?
- B. Has the siting climate changed enough so that important attributes and attitudes towards them are no longer valid? If not, are they appropriate to this level of analysis?

Table III-6 (Cont'd).

CANDIDATE SITE SELECTION CHECKLIST

I. Is the method of candidate site selection specified (Sections 2.5, 4.5, and 5.3)?

  A. If so, is it a standard method or "seat of the pants?"

II. Are selection criteria specified (Section 2.3)?

  A. Are they complete or, if incomplete, are they appropriate to this level of analysis?

    1. Are they disproportionately cost related?

  B. Is there any consideration of tradeoffs among attributes?

    1. If so, are weights used?
    2. Does the report specify whose weights are represented?
    3. Is the weighting method described? Is it a standard form?
    4. Does the method ensure ratio-scaled weights?
    5. If not, is the reason why not justified?
    6. Is the decision rule correctly applied?

III. Are criteria for reducing the original slate to a smaller number of sites specified (Section 4.5)?

  A. Are tradeoffs considered?

    1. If so, see II.B above.

IV. Does the final slate of alternatives include more than two sites?

  A. If not, is the small number justified on some reasonable basis?

V. Is anything done that specifically affects complexity? Are there exogenous requirements that affect complexity (Section 5.3)?

  A. If it is low, is there dominance or are all sites alike?

  B. Is there evidence of possible "deck stacking" (extreme dominance)?

FINAL SITE SELECTION CHECKLIST

I. Is the method of site selection specified? Is it a standard method (Section 2.5)?

  A. If not, is its use justified? Does it seem reasonable with respect to the theoretical considerations discussed in the technical papers associated with this report?

    1. How does it deal with tradeoffs?
    2. Are weights included? If so, do they meet the requirements of the method with respect to measurement theory?
    3. Does the decision rule create implied weights different from the specified weights?

II. If the method is standard, is it applied correctly (Section 2.5)?

  A. Do the attributes meet requirements for independence, clarity of definition, and quantifiability?

  B. What are the bases for converting attribute levels to subjective value estimates?

  C. What weighting method is used?

    1. Does the report specify whose weights are represented?
    2. Is the weighting method described? Is it a standard form?
      a. If not, why not?
    3. Does the method ensure ratio-scaled weights or at least a nonarbitrary zero point?
    4. If not, is its use justified?

III. If the method is not correctly applied, is the complexity of the slate of candidate sites sufficiently high so that correct application of the method might make a difference in decision (Section 5.3)?

IV. Have sensitivity analyses been made on results?

  A. If results are sensitive, how is the final decision justified?

Another series of studies on power plant siting methodology was conducted at the Oak Ridge National Laboratory in the late 1970s by Honea, Voelker, Hobbs, Jalbert and others. The Oak Ridge researchers first rated 19 proposed criteria for siting a coal-fired power plant using the "nominal group process." This technique is an "iterative" method, similar to the Delphi process, which allows ranking each item after repeated considerations.* The results of the Oak Ridge ranking is shown in Table III-7.

Based on this process, the Oak Ridge researchers prepared a cell-based computer program for locating and mapping potential sites, and constructed a weighted siting methodology using seven criteria: water availability (10 pts), air quality maintenance (10 pts), accessibility of low-sulfur coal (8 pts), barge accessibility (7 pts), rail accessibility (6 pts), accessibility of high-sulfur coal (4 pts), and population density (3 pts). See Table III-8.

While this site selection system is not as sophisticated as the one used, for example, by Seminole Electric Cooperative, it is a point of reference for planners considering the issue in Florida. For further information on the Oak Ridge Studies, see the publications by Jalbert, Voelker and Honea in the Bibliography, Section 5, below.

In addition, planners can consult the power plant siting handbook prepared by the Berkshire County Regional Planning Commission. In this handbook, the elements of site screening are discussed, as is the site selection methodology used by the Battelle National Laboratory. The Battelle methodology can be compared with a methodology used in a PPSA to be reviewed.

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*For a definitions of these and other terms, see the Glossary, Attachment VI.

Table III-7: Factors and Weights Used in Rating Power Plant Siting Criteria by the Oak Ridge National Laboratory. Source: Honea (1979).

First vote	Second vote	Factor	Definition
92	98	Availability of water	Reflected in costs for acquiring water (example — reservoir), impact of getting and using water, and chance of future conflict with growing use by others
95	97	Minimum proximity to undesirable population distribution	NRC guidelines
93	94	Minimum adverse geological features	Geology and soils related to foundation cost and safety considerations of subsidence
95	89	Minimum adverse impact on regional aquatic biota	Rare and endangered species and loss of habitat
85	88	Minimum susceptibility to maximum hydrological/meterological events	Includes such things as dam failures and floods
89	85	Minimum adverse impact on regional terrestrial biota	Rare and endangered species and loss of habitat
80	83	Minimum adverse impact on existing and potential land use	Incompatibility with perceived future or present use of site and surrounding area
75	72	Minimum a value for Bureau of Economic Area Region	Calculation of potential acceleration caused by seismic activity. Tectonic province used at this scale. Determines if standard plant design can be used
71	70	Regional water quality	Impact on quality by plant and quality of input for plant
57	56	Presence of acceptable transportation systems	Could not be sufficiently defined
43	58	Land surface slope and relief	Rough terrain leads to excessive grading costs and poor accessibility
53	55	Minimum proximity to man-made hazards	Airports, military installations, etc.
46	46	Acceptable air diffusion	Poor diffusion leads to double containment and increased costs
53	43	Minimum adverse impact on historical/archaeological areas	Proximity to important sites or presence of unexplored sites as Indian mounds
45	41	Adverse impact on regional economy	Housing, services, etc.
43	38	Minimum impact on regional recreation	Affect patterns of recreation or type of recreation
31	35	Maximum proximity to load	Could not be sufficiently defined
36	29	Unfavorable attitude of regional population	Potential for local opposition
17	17	Maximum reliability of offsite power	Power to run plant, a safety concern

Source: A. M. Voelker, *Power Plant Siting: An Application of the Nominal Group Technique*, ORNL/NUREG/TM081, Oak Ridge National Laboratory, Oak Ridge, Tennessee (February 1977).

Table III-8: Regional Siting Criteria Scale Used by the Oak Ridge National Laboratory. Source: Honea (1979).

Variable	Importance weight	Category or value	Compatibility index
Water availability	10	Adjacent to stream with 7-day/10-year low flow ≥194 Mgd	10
		Adjacent to stream which could have 7-day/10-year low flow ≥194 Mgd if additional regulation were imposed	4
		Adjacent to Great Lakes	8
		Adjacent to Atlantic Ocean or Gulf of Mexico	5
		Other counties	[b]
Air quality maintenance areas (AQMA)	10	Not an AQMA	10
		Partially an AQMA	5
		Entirely an AQMA	[b]
Accessibility of low-sulfur coal (≤1.9% S)	8	Values represent calculations from gravity model using tonnage of low-sulfur coal	
		Highest value	10
		Lowest value	1
		>300 miles from low-sulfur coal reserve	0
Barge accessibility	7	Adjacent to channel of ≥9 ft depth	[a]
Seismic activity	6	Activity level I (lowest risk)	10
		Activity level II	5
		Activity level III (highest risk)	0
Rail accessibility	6	Adjacent to medium- or heavy-duty railroad	10
		Not adjacent to medium- or heavy-duty railroad	0
Accessibility of high-sulfur coal (>1.9% S)	4	Values represent calculations from gravity model using tonnage of high-sulfur coal	
		Highest value	10
		Lowest value	1
		>300 miles from high-sulfur coal reserve	0
Population density	3	90-100% of county has ≥500 inhabitants per square mile	0
		80-90%	2
		70-80%	3
		60-70%	4
		50-60%	5
		40-50%	6
		30-40%	7
		20-30%	8
		10-20%	9
		0-10%	10

[a]Score equals number of miles of channel (maximum is 94.6).

[b]Excluded from consideration as potential candidate counties.

4. Comments on Siting Methodology in Florida

Because there are no state standards for siting methodology in Florida, the state cannot review a site certification application to determine if it complies with approved site procedures. However, planners reviewing an application may want to consider the following comments and suggestions:

--In all cases studied, the utility provided detailed information on only one proposed site. Planners may want to request detailed information on additional sites so that they can be compared with the site named by the applicant.

--In the Power Plant Site Application, some utilities have supplied only narrative, non-quantitative information to describe the rating of potential sites. Because the information provided is often sketchy, the conclusions of the utlity cannot be replicated or confirmed. And applications with quantified information often fail to meet the criteria of the Brookhaven studies for a full description of assumptions and reasons for choices made. Planners may want to request more complete information from the applicant.

--Some applications have not included the results of sensitivity analyses, showing the effects of applying differing weights to rating variables. Planners may wish to replicate the applicant's conclusion using a number of different weights.

--As a rule, most Florida utilities have not included the public in the site selection process, as is done in a number of other states. Certification by a municipally-owned utility ultimately involves elected officials, but even in these cases evidence is seldom given for public participation in the early stages of site selection. Public planners could request to be a part of site selection early in the process, but unless the regulations issued by the Department of Environmental Regulation are changed, this cannot be required.

--In none of the certification applications studied did the applicant utility provide information about the relationship of the utility to the proposed site. In reviewing a PPSA, a planner may wish to tknow: Does the utility already own the land? Does it have an option on the land? Do officials of the utility have a financial interest in the land?

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CHAPTER 4

POWER PLANT COOLING

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Power plants require enormous amounts of water: Over 25% of all water withdrawn in Florida is for the purpose of power plant cooling. Although this water is not consumed since it can be used again, the heated water discharged by a plant is 10 to 30 degrees warmer than in-coming water, and has the potential for causing significant harm to the environment. The question of water use by power plants, therefore, is significant, and has become a major issue in the certification of a number of power plants in Florida.

For this reason, planners considering a power plant plant site application will want to give close attention to the plans of the utility for drawing in and discharging cooling water, and may wish to evaluate a number of different cooling technologies. This chapter is designed to help planners with these tasks.

A. POWER PLANT COOLING IN FLORIDA

1. Introduction

All waste heat from power plants must eventually be dissipated to the environment. Some heat is tranferred directly to the ambient air and, in the case of fossil-fueled plants, some heat is discharged up the stacks. However, in all coal-burning power plants presently in operation in Florida, the bulk of the waste heat is transferred from the steam to cooling water in the condensers, and then allowed to dissipate heat to the atomosphere.

Water is used as the absorbent because of its general abundance, its high "specific heat,"* and its ability to dissipate heat in the evaporation process. But waste heat discharged to water bodies contributes to physical and biological changes, and constitutes a potential polluting agent. Concerns for environmental protection--and the state and federal regulations stemming from these concerns--increasingly require the use of cooling systems that reduce or eliminate the discharge of waste heat to water bodies. These measures, however, increase both capital and operating costs, and decrease plant efficiency.

Large amounts of water are used for cooling and condensing purposes by major industries. However, electric power production accounts for more than four-fifths of the total cooling water used in the United States and accounts for nearly one-third of the total water withdrawn for all purposes in the nation.

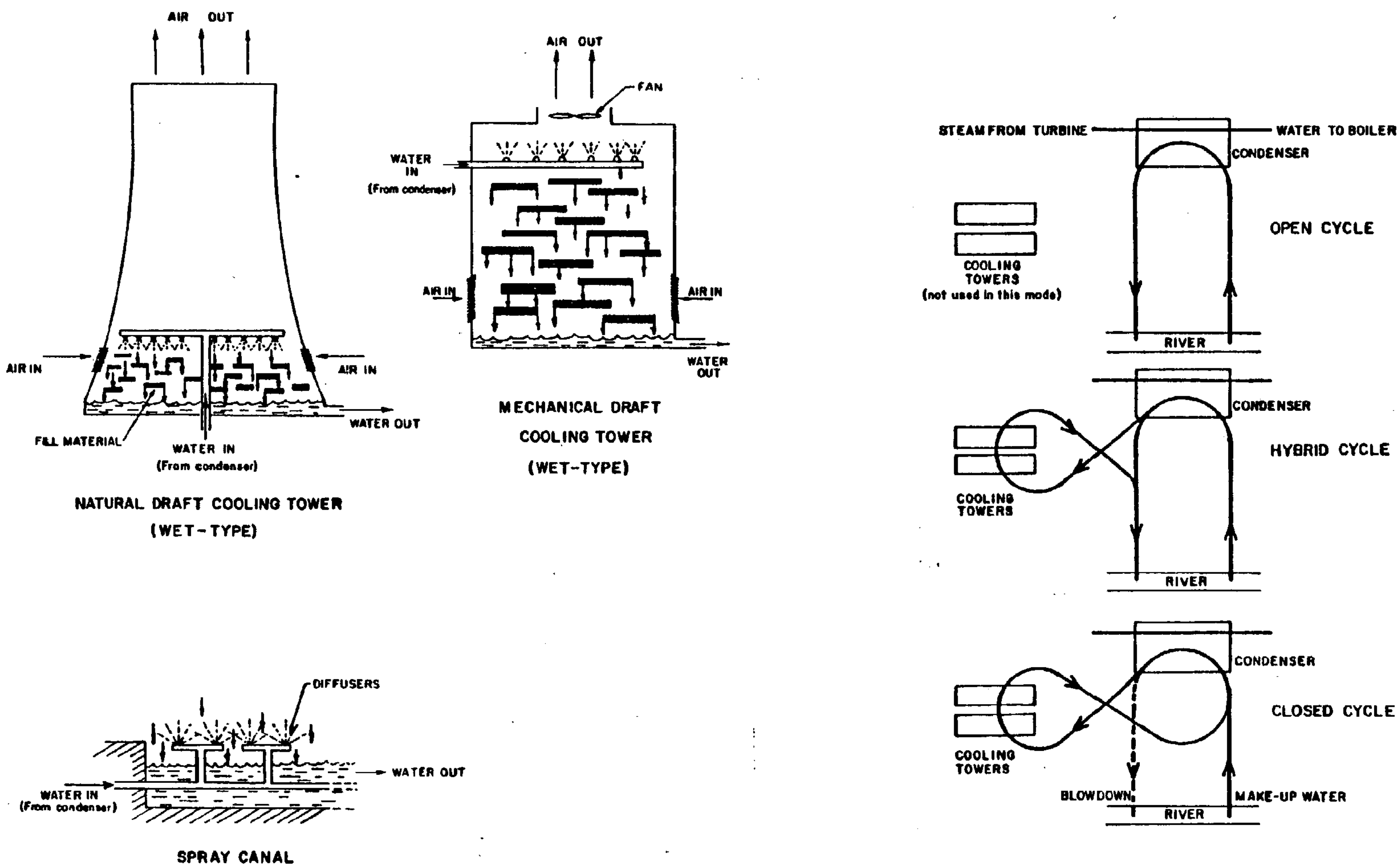
The principal types of cooling systems now in use or proposed for steam-electric plants are:

1) once-through cooling using fresh or saline water
2) cooling ponds, including spray ponds
3) natural draft cooling towers
4) mechanical draft cooling towers
5) dry cooling

In some cases, a combination of systems may be used. The water withdrawal requirement varies widely among these technologies. Fig. IV-1 provides diagrams illustrating these cooling systems; each of these five technologies is described in Section B.

*See Glossary, Attachment V, for a definition of terms.

Fig. IV-1. Power Plant Cooling Technologies. Source: Hekler (1974). Used by permission.



2. Power Plant Cooling in Florida

In dealing with the question of power plant cooling, planners should bear in mind the distinction between water "consumed" and water "withdrawn." "Water consumption" implies removal without returning water to the environment, while "water withdrawal" implies return of the water to nature to be used again.

According to the U. S. Geological Survey, 25.5 percent of all water withdrawn in Florida in 1980 was for the cooling of thermoelectric power plants. However, almost all of this water was returned to be used again; only 1.7 percent of water withdrawn in Florida for all purposes was consumed by power plants. Of the total amount withdrawn for power production in Florida in 1980 (15,699 million gallons per day), 88.2 percent 840 MGD) was saline.

Table IV-1 shows the types of cooling systems used by coal-fired power plants in Florida in 1980, the last year for which water use statistics have been published by U.S.G.S. In that year, four coal-fired power plants used once-through saline water for cooling, and two plants used fresh water cooling. Since 1980 ten new coal-fired power plant units have been either completed or certified. As seen in Table IV-2, two plants (FPC's Crystal River units 4 and 5, and TECO's Big Bend 4) use saline cooling water, although the Crystal River units will use cooling towers and the Big Bend 4 unit will use the once through cooling process.

Three new units, all located along inland waters, use waste discharged from sewage plants or heated water discharged by power plants these are: The JEA/FPL St. Johns River Power Park units 1 and 2, located on the St. Johns River near Jacksonville, Lakeland Utility's McIntosh 3 plant, and OUC's Stanton 1 plant (which will use waste sewage for two-thirds of its cooling water).

*See Chapter 1 for a description and a map showing the location of each power plant referred to here.

TABLE IV-1. Water Use by Coal-Fired Power Plants in Florida, 1980. Source: USGS (1983).

UTILITY/PLANT	COUNTY	1980 POWER PRODUCTION (MWH)*	TYPE OF COOLING SYSTEM	WATER USE (MGD)	WATER USE (MG/D/MWH)
I. FLORIDA POWER CORP. (FPC)					
1. Crystal River 1 & 2	Citrus	4485.2	Once-Through, Saline	758.8	5.91
II. TAMPA ELECTRIC CO. (TECO)					
1. Gannon 5 & 6	Hillsbr.	5256.8	Once-Through, Saline	n.a.	n.a.
2. Big Bend 1 - 3	Hillsbr.	6440.0	Once-Through, Saline	1041.0	6.19
III. GULF POWER CORP.					
1. Smith 1 & 2	Bay	2068.3	Once-Through, Saline	403.5	5.13
2. Scholz 1 & 2	Jackson	316.7	Once-Through, Fresh	118.0	2.68
3. Crist 4 - 7	Escambia	3762.0	Mechanical Draft Tower, Brackish	335.6	11.21

* Coal-fired steam boilers only; does not include combustion turbine or nuclear

The location of each plant discussed but not yet certified reflects the need for proximity to a source of cooling water. While these plants are only speculative, they are mentioned because if Power Plant Site Applications for any of these are file, planners may deal with these plants in future years. FPL's Martin 3 and 4 plants would most certainly use the cooling lake presently used by the Martin 1 and 2 oil-fired units. FPL's "potential site" in Desoto county, near Arcadia, is near the Peace River. Because water flow of the river near Arcadia varies seasonally, a reservoir might have to be built.

TECO's McInnes site, described in the 1983 Ten-Year Site Plan (TYSP), is adjacent to Tampa Bay to take advantage of bay waters. This site is not in the 1984 TYSP. FPC's Gulf County site, which appeared in earlier TYSPs of FPC but does not appear in the 1984 TYSP, is adjacent to St. Joseph's Bay, on the Gulf of Mexico. SECI is currently investigating the use of fresh water wells for cooling the proposed Taylor County site, south of Perry.

Table IV-2. Water Use by Coal-Fired Power Plants in Florida Coming On-Line After 1980. Sources: Utility PPSAs.

	POWER PLANT/UTILITY	COUNTY	IN-SERVICE DATE	TYPE OF COOLING COOLING SYSTEM AND WATER TYPE	PROJECTED WATER WITHDRAWAL RATE (MGD)
I.	FLORIDA POWER AND LIGHT				
	St. Johns River Power Park	(see JEA below)			
II.	FLORIDA POWER CORP. (FPC)				
	Crystal River 4 and 5	Citrus	1982 & '84	Nat. Draft Cool. Twr. (Saline)	663.5
III.	TAMPA ELECTRIC CO. (TECO)				
	Big Bend 4	Hills.	1984	Once-Through (Saline)	347.0
IV.	GAINESVILLE/ALACHUA COUNTY				
	Deerhaven 2	Alachua	1981	Wet Cool Twrs, Mech. (Fresh)	N.A.
V.	JACKSONVILLE ELECTRIC AUTH. (JEA)				
	St. Johns Riv. Power Park 1&2	Duval	1987 &'88	Nat. Draft Cool Twr. (Brackish)	11.23*
VI	CITY OF LAKELAND (LAK)				
	McIntosh 3	Polk	1982	Wet Cooling Tower, Mechanical (Fresh)	229.0**
	Stanton 1 (see OUC)				
VII.	ORLANDO UTILITIES CMMSN (OUC)				
	Stanton 1	Orange	1986	Nat. Draft Cool. Twrs (w/small cooling pond)	3.85***
VIII.	SEMINOLE ELECTRIC COOP (SECI)				
	Seminole 1 and 2	Putnam	1983 &'85	Closed-Cycle Low-Volume Nat Draft Cooling Towers (Fresh)	23.0

* These figures are for ground water and surface water withdrawn. Plants actually require 362 MGD, but an adjacent oil-fired plant is to provide 97% of cooling water.

** Uses 3 MGD of treated sewage waste water discharge

*** Two-thirds of water to be supplied by waste sewage from Iron Bridge sewage treatment plant (2667 gall. per minute); precipitation can provide 1037 GPM; wells 202 GPM.

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B. TYPES OF COOLING SYSTEMS

1. Once-Through Cooling

With once-through cooling, water is take from a water body suchas a river, lake or the ocean, passed through the condenser, and then returned to the source body of water. This type of system is generally used where there are plentiful supplies of water and where the resulting effects on water quality are not expected to be ssevere. Normally, once-through cooling is more economical than other systems and, in most cases, affords higher "thermal efficiency" (i.e., less energy losses) for power production.

The amount of water a plant will use for once-through cooling is a function of the amount of heat to be removed the temperature of the receiving water, the type of water in which the discharge is located, currents, and so forth. This can be illustrated by the Seminole 1 plant of the Seminole Electric Cooperative, located on the St. Johns River near Palatka. With two units totalling 1240 MW, the amount of water which would have to be drawn in would be a direct result of the temperature in the receiving waters allowed by DER regulation.

Location	Max. Temp. Rise Allowable (Deg. Fahrenheit)	Water Drawn In (Bill. Gal. per Day)
Coastal Waters	2	8.5
Fresh Water Stream	5	1.23
Open Waters	17	1.0

To put this amount in perspective, one billion gallons per day is equivalent to three times the flow of Silver Springs. Only three Florida rivers have an average daily flow this large during dry years. One billion gallons per day is equivalent to a water intake of 1.2 million acre-feet per year. By comparison, the entire Hillsborough Bay contains 269,000 acre-feet at low tide. (An "acre-foot" is the amount of water contained in one acre, spread to a depth of one foot.) This refers to water "withdrawn" rather than "consumed."

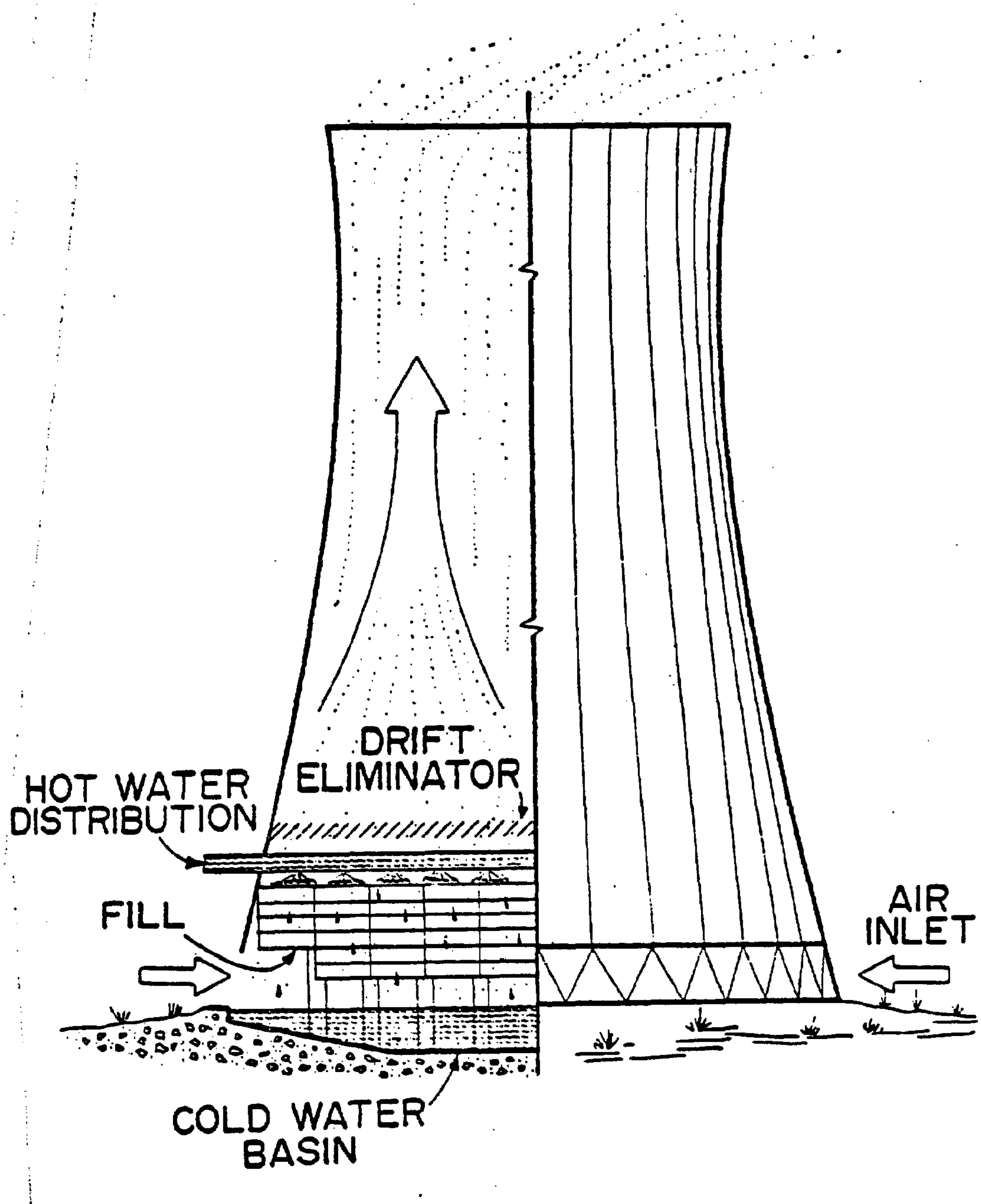

DRIFT ELIMINATOR
HOT WATER DISTRIBUTION
FILL
AIR INLET
COLD WATER BASIN

Fig. IV-2 shows the potential thermal impact in Hillsborough Bay if all four units of TECO's Big Bend plant were operating at 100% capacity. Note that at the point of discharge, the temperature rise would be about 14.4 degrees F (8 degrees C); at a distance of one mile, the rise would be 8 degrees F (5 degrees C); and at a distance of two miles, the temperature rise would be about 3.6 degrees F (2.0 degrees C). This is a "worst-case" scenario, for the plants operate at 100 per cent of capacity only rarely.

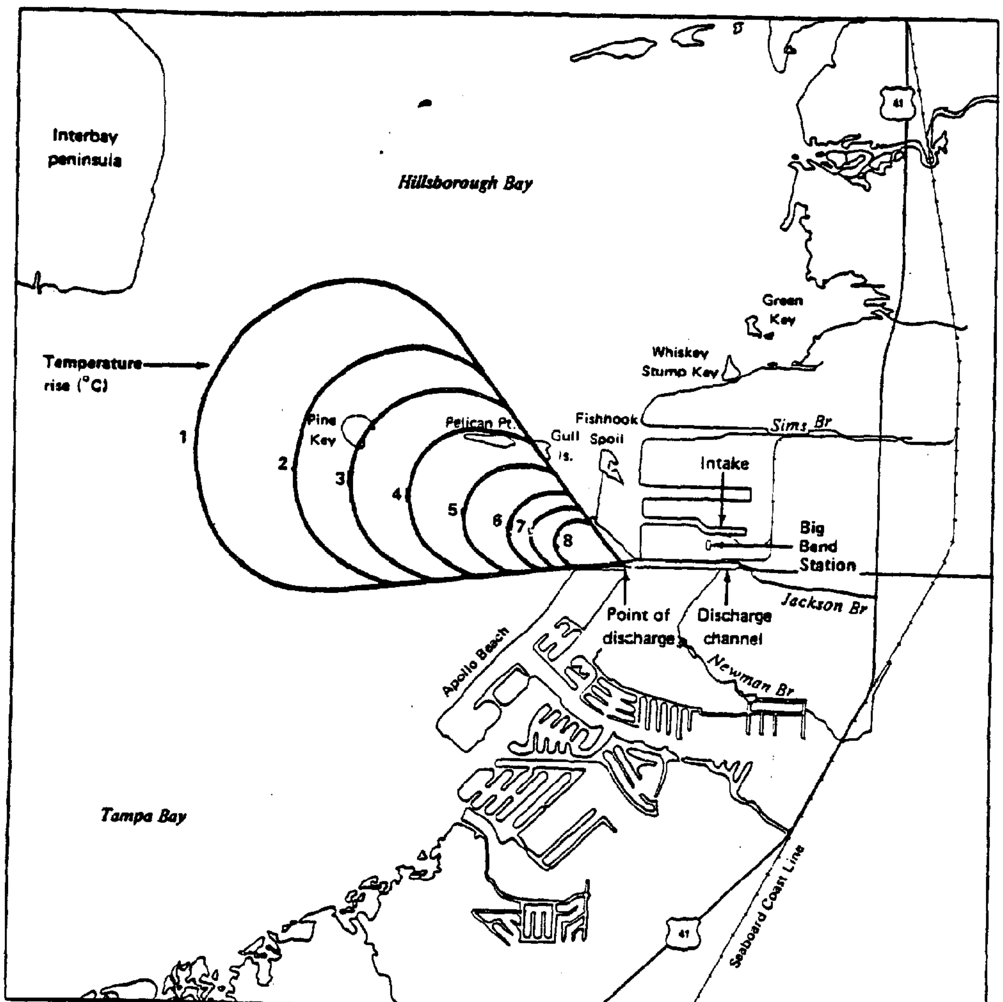
2. Cooling Ponds

In a cooling pond, water is recirculated between the condenser and the pond. In Florida, there are presently no coal-fired power plants located on a cooling pond, but Florida Power and Light has built cooling ponds for oil-fired plants located in Martin, Manatee and Seminole counties, and for its Turkey Point nuclear plant in South Dade County.

At a cooling pond, sufficient inflow is needed--from upstream runoff, rainfall, by diversion from another stream, or by groundwater makeup--to replace the water lost by evaporation induced by the addition of heat to the pond and to control the buildup of minerals in the cooling water. Cooling ponds can be used for other purposes such as sources of municipal water supply and for recreational uses.

The volume and surface area needed for a cooling pond depends on a variety of factors, including: size of the power plant, ambient air temperature, humidity, rainfall, wind speed and so forth. The size of FPL's Manatee cooling pond varies from 2,500 to 4,000 acres, depending on how full it is. A cooling pond sufficient for 3200 MW of coal-fired capacity at TECO's MacInnes site has been projected by the utility to require 5,000 acres (approximately eight square miles). The cooling capacity for a pond may be increased by spraying the warm water into the air over the pond surface.

Fig. IV-2. Water Discharge Temperatures at the Big Bend Power Plant, Tampa Bay, If All Four Units are at 100% Load with No Dilution (i.e., short-duration maximum peak load). Source: TECO BB4 PPSA. Note that a change of 8o C = a change of 14.4o F; a rise of 2o C = a rise of 3.6o F.



Source: TECO (1980c).

3. Natural Draft Cooling Towers

In natural draft cooling towers, the warm water is brought in direct contact with a flow of air, and the heat of the water is dissipated, principally by evaporation. As seen in Fig. IV-1, the warm water is brought to a dispersal section at the top of the tower, called the "fill". In "splash" type towers, the fill breaks the water into droplets that subdivide as they descend, thereby exposing large surface areas to the air for the evaporative heat transfer. In "film" type cooling towers, the water is allowed to descend as a thin film so as to expose a large area to the air for heat transfer. The cooled water is collected in a basin under the fill section from which it is pumped back to the condenser to pick up more heat and then is returned to the cooling tower.

Natural draft cooling towers, which may stand 450 feet high, resemble the cooling towers commonly used for nuclear power plants; the hyperbolic shape is often mistakenly associated in the mind of the public only with nuclear power. In these towers, water falls by means of gravity, unlike mechanical draft towers in which large fans are used.

As seen in Table IV-2, natural draft cooling towers are far and away the most common form of cooling for new coal-fired power plants in Florida: All coal-fired plants certified to come into service after 1985 will have natural draft cooling towers. There are the JEA/FPL St. Johns River Power Park, OUC's Stanton 1, SECI's Seminole 2, and FPC's Crystal River 5.

4. Mechanical Draft Cooling Towers

Until recently all cooling towers constructed in this country for steam-electric plants were of the mechanical draft type. In Florida, there are three major applications of mechanical draft towers in coal-burning power plants: GFC's Crist power plant near Pensacola; Gainesville's Deerhaven 2; and Lakeland's MacIntosh 3. Fans in mechanical draft towers provide positive control over the air supply, and thus permit substantial control over the temperature of the cooled water. These towers, however, are more costly to operate than natural draft towers because the fans consume considerable amounts of power.

5. Dry Cooling Towers and Alternative Cooling Technology

In "dry" or "air" cooling systems, heat is dissipated to the air by conduction and convection in a heat exchange analogous to an automobile radiator. Thus, there are no evaporative losses of water. Although this system consumes infinitely less water than wet-cooled designs, a much greater air movement is necessary to absorb the heat, particularly in high-humidity areas such as Florida. This cooling technology has been employed in drier regions of the nation, but thus far has not been used in any Florida power plant.

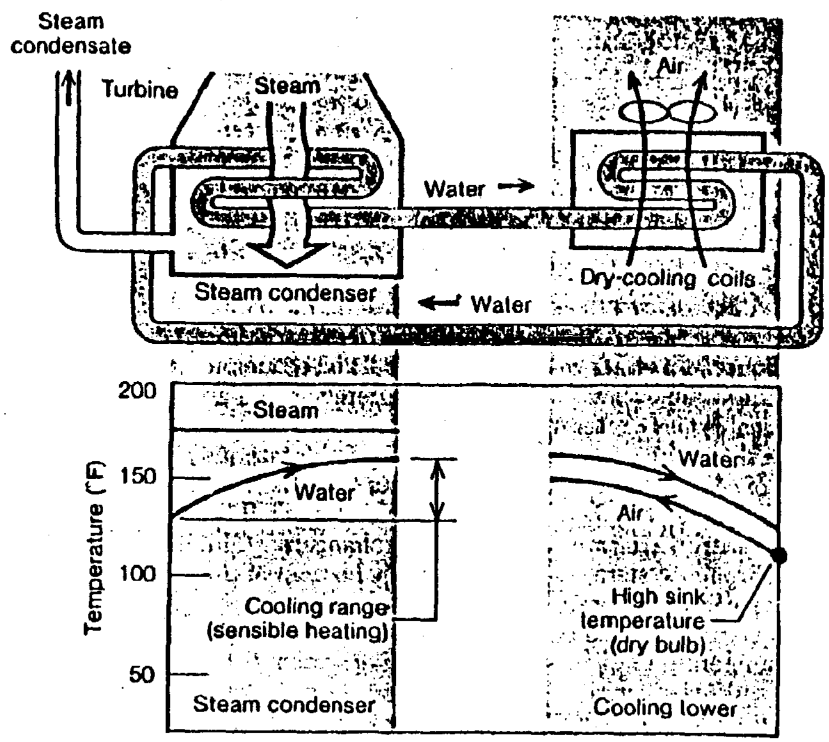
Fig. IV-3 shows how two types of dry cooling systems operate. In recent years, considerable attention has been given to advanced cooling and combined wet/dry cooling techniques, such as towers using ammonia as the coolant. Because this is an untried technology in Florida, little detail will be given to this technology here. However, planners considering alternatives to convention water-using methods may wish to consult the bibliography on this subject below.

6. A Comparison of Cooling Technologies

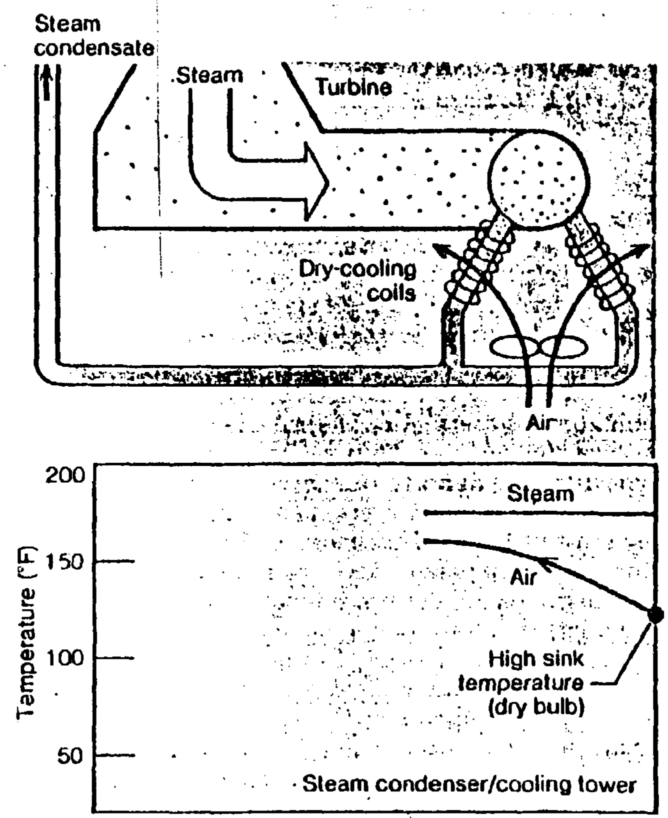
The essential question that most planners will have in reviewing a power plant site application is which technology to be employed will achieve the necessary level of cooling at the least cost and with the least environmental damage. As an example of the kind of analysis which must be performed, this section examines the environmental impact statement prepared for the St. Johns River Power Park, owned jointly by JEA and FPL and located just north of Jacksonville.

As shown in Table IV-3, the U.S. Environmental Protection Agency compared three types of cooling technologies in its environmental impact assessment of the SJRPP: natural draft cooling towers, rectangular mechanical draft cooling towers, and round mechanical draft cooling towers. In this comparison, EPA did not consider a cooling pond, dry cooling or once-through cooling.

Fig. IV-3. Dry Cooling Technologies. Source: Bartz (1982).



(c) Indirect-Closed Water Loop



(d) Direct Steam Condensation

In the St. Johns River Power Park EIS, the capital cost for natural draft cooling towers was rated as significantly higher than for mechanical draft towers, but the annualized cost was lower. This is because no electricity is needed to operate fans, as in mechanical draft towers. More salt drift would be given off with natural draft towers and these 360 - 550 foot towers would dominate the landscape for miles around because of their commanding height. But despite these drawbacks, EPA recommended natural draft towers in this application, considering the economic benefits.

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(See Also: Impacts of Heated Water Discharge)

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Table II-3. Comparison of Cooling Technologies for the St. Johns River Power Park Units 1 and 2. Source: SJRPP EIS (1981).

Characteristic	Natural Draft Cooling Towers	Rectangular Mech. Draft Cooling Towers
Capital Cost (Mill. $)	46.178	36.703
Annualized Cost (Mill. $)	10.660	12.163
Energy Consumption (Net MW-hrs/yr)	base	+12,145
Vapor Plumes	higher rise, longer drift	mod. rise and drift
Ground Fog Potential	mod. to low	higher
Salt Drift	longer drift lower concentrations	shorter drift higher concentrations
Height	tall (360 - 550')	moderate (60 - 100')

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C. ENVIRONMENTAL IMPACTS OF COOLING SYSTEMS

1. Impact of Thermal Discharges

All discharges of heated water will contribute to physical and biological changes in the receiving body of water. These changes can be beneficial, detrimental, or insignificant depending upon the ecology of the particular water body, the desired uses of that body, and the amount and temperature of the discharges. When the discharge of heated cooling water produces effects that are detrimental to other desired uses of water, it can be said that "thermal pollution" has occurred.

Thermal pollution is significantly different from other forms of pollution, since, unlike chemical wastes or sewage, it does not involve the addition of foreign matter to the environment and the heat is usually dissipated into the atmosphere rather quickly. The addition of heat to water bodies, however, may increase the rate of chemical solubility and biochemical reactions, causing effects on aquatic organisms in the area of higher temperatures. Thus, the addition of heat to a water body can alter the aquatic environment unfavorably and heat may then be regarded as a potential polluting agent.

The capacity of water to hold dissolved oxygen is decreased with an increase in temperature. This oxygen-carrying capacity is usually expressed as the "saturation level." Planners will find that a key terms in power plant site applications is the level of "biological oxygen demand" (termed BOD) in the "receiving body of water" (RBW) and "dissolved oxygen" (DO).

The addition of heat to a water body can cause "stratification," a condition in which the body of water is composed of horizontal layers of water a different temperatures. These layers also have different densities, reflecting their temperature, and resist mixing. Heating causes a reduced density in warmer water; a difference in temperature of only a relatively few degrees is often sufficient to cause the waters to flow in distinct layers. Stratification can inhibit the movement of oxygen and nutrient between layers of water, potentially starving both plants and animals in one or more layers.

Temperature changes normally play an important and highly regulatory role in the growth of aquatic plants and in the growth and physiology of fish and other cold-blooded aquatic animals. Reproductive cycles, digestive rates, respiration rates, and other processes occurring in the bodies of aquatic animals are often temperature dependent. These effects are not consistent among species, however, so thermal constraints are among the most difficult to define and establish.

On the other hand, thermal discharges when properly controlled have resulted in an increase in the ability of certain commercially valuable aquatic species to multiply, while at the same time decreasing the time for the species to reach maturity. It is apparent, therefore, that the impact of heated water discharges on aquatic ecosystems is not always nagative; a thorough study may be needed.

Temperature is a major factor in determining the organic waste assimilation capacity of a water body. The water temperature plays a triple role, affecting the rate of oxidation of pollutants, the capacity of the water to hold oxygen in solution, and the rate of aeration of the water. The net effect of adding heat to a body of water usually will be a lowering of its capacity for satisfactorily assimilating organic wastes.

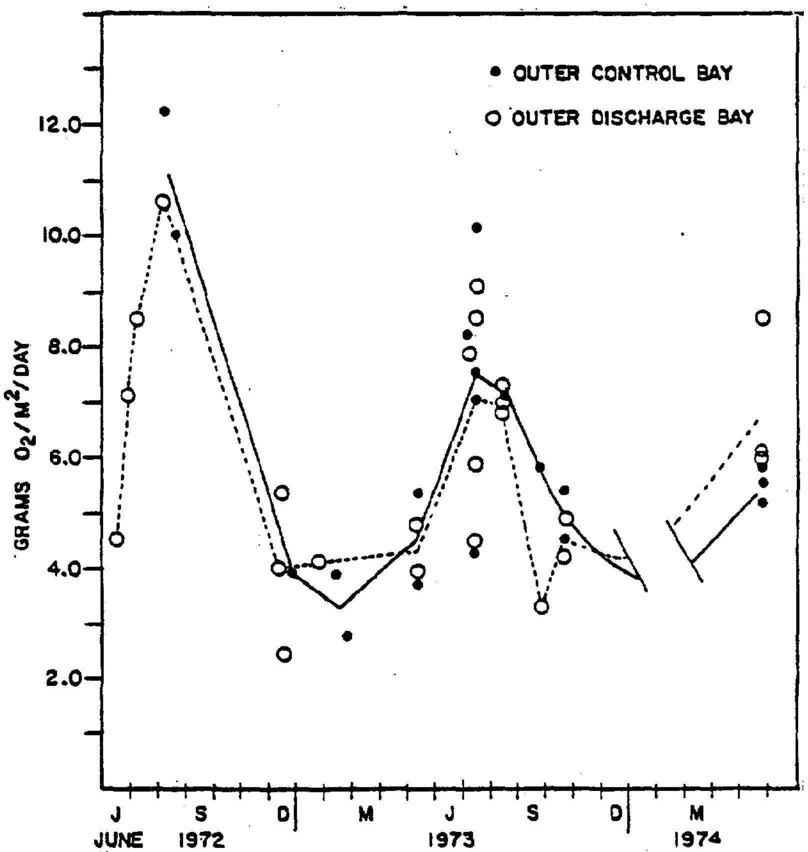
Major studies have been completed on most once-through cooling systems in Florida (see Bibliography, below). Typical of these reports is the study of Florida Power Corp.'s Crystal River plant directed by Dr. Samuel Snedaker of the Dept. of Environmental Engineering at the University of Florida from 1972 to 1974. This study found that total plant and animal life in the discharge canal of the power plant was 35% less than in the intake canal.

Although the impact was severe close to the plant in the discharge ("outflow") canal, farther from the plant, in the discharge bay, over a period of one year the total "predation" of the power plant (i.e, its negative effect on plant and animal organisms) produced a 1.27 percent reduction in all species in the discharge bay compared with the control bay. (See Fig. IV-5).

At the time the study was undertaken, no cooling towers were used at the Crystal River site; since that time, new units have been built with cooling towers to reduce the temperature of discharge water. The researchers found that water temperatures in the discharge bay of the Gulf of Mexico averaged about 4.5 degrees F higher than in a control bay nearby.

To reduce the undesirable impacts of heated water discharge, state regulations require that all new discharges, or proposed discharges, of heated water into surface waters under state jurisdiction meet strict environmental regulations. Under the regulation, facilities discharging heated water on or before July 1, 1972 are allowed to operate with no thermal standards as long as they "do not substantially damage or harm aquatic life or interfere with beneficial uses assigned to the receiving body of water."

Fig. IV-4. Estimates of Total Community Gross Primary Production, Outer Discharge Bay and Control Bay, Crystal River Power Plant, 1972 - 1974. Source: Snedaker et al. (1974).



7. Local Governments

Local governments are the first avenue of assistance for citizens. For this reason, the Power Plant Siting Act allows the municipality and the county in which the plant is to be built to comment on its impact. The local governments' commtns should identify any variances from zoning ordinances or land use plans which might be necessary; if the local government objects to granting a variance, this must also be mentioned.

Under §403.508(5) of the PPSA, local governments in whose jurisdiction the proposed plant is to be located are allowed to be "parties" to the siting case. (See Attachment I). The concerns of local governments are addressed in the report of the Department of Community Affairs. This provision is different than the corresponding section of the Transmission Line Siting Act, which automatically makes local governments parties, unless they waive the right. (See Fig. IV-4.)

8. Regional Planning Councils

The Power Plant Siting Act does not specifically mention Regional Planning Councils (RPCs), but in practice they RPCs are routinely asked to participate in the review of applications. The areas that RPCs comment on are likely to include the relationship of the proposed plant to comprehensive plans in the region and conflicting issues between local governments. RPCs are expected to provide assistance to local governments in reviewing a proposed power plant. (See Fig. IX-6 for a map of Florida's eleven RPC districts.)

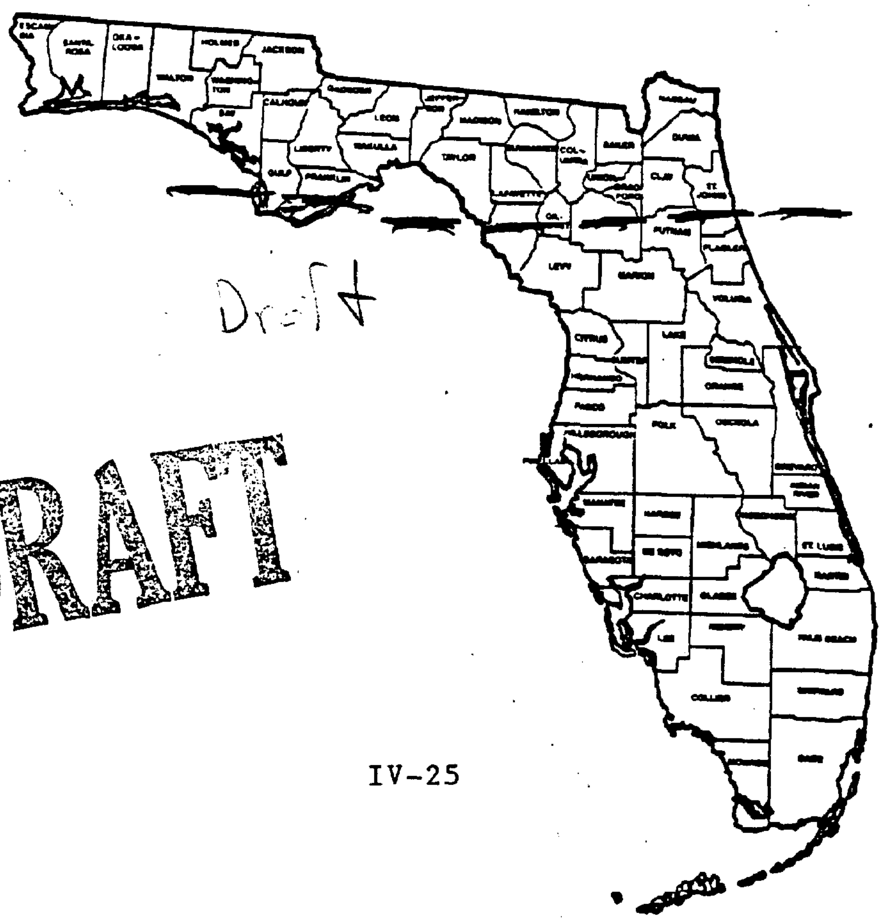
9. Federal Agencies

Strictly speaking, federal agencies are not a formal part of Florida's power plant siting process. However, a number of federal agencies are routinely involved in power plant siting in all states under federal law. Among the federal agencies most frequently involved in siting cases are the Environmental Protection Agency (EPA), the Army Corps of Engineers (COE), the Fish and Wildlife Service (FWS), and the Federal Aviation Administration. For a directory of these agencies, see Attachment IX.

Table IV-4. Maximum Heated Water Discharge Temperatures in Florida. Source: Sect. 17-3.05, FAC. All temperatures are maximum morning temperatures, degrees Fahrenheit.

STREAMS	LAKES	COASTAL SUMMER	COASTAL REMAINDER	OPEN WATER
NORTH				
90	90	92	90	97
+5	+3	+2	+4	+17
SOUTH (PENNINSULAR FLORIDA)				
92	92	92	90	97
+5	+3	+2	+4	+17

Fig. IV-5: Northern and Southern Discharge Temperature Regions in Florida.



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2. Cooling Tower Blowdown

In considering the environmental impacts of cooling towers, planners need to understand to commonly used terms: cooling tower "makeup" and cooling tower "blowdown." Cooling tower "makeup" is the water which is drawn in to replace a portion of the cooling water before dissolved chemicals become so concentrated by evaporation that scaling occurs. It replaces evaporation losses and "blowdown"--the heated water discharged by the tower in order to avoid chemical concentrations that could cause scaling.

As an example of this problem, Table IV-5 shows the anticipated chemical concentrations at the Point of Discharge (POD) from the cooling towers of SECI's Seminole 1 plant on the St. Johns River. The utility's power plant siting application projected a level of Total Suspended Solids (TSS) 28 percent above the "recommended" level set by the Department of Environmental Regulation, Total Dissolved Solids (TDS) were projected to be 274 percent above the recommended level, and aluminum 500 percent above. Iron was 124 percent above, and chloride 540 percent above. These are maximum amounts at the Point of Discharge, and will be less downstream, owing to the diluting characteristics of river water flow.

Because cooling tower blowdown may contain chemical concentrations above in excess of water quality criteria, planners are likely to give detailed attention to the question of water quality impacts from cooling. The discharge of hazardous chemicals from cooling tower blowdown in excess of state maximum standards has caused a number of electric utilities to apply for--and receive--variances from state water quality standards.

Table IV-6, for example, shows the two-year variances received by TECO for the Big Bend 4 plant for arsenic, cadmium, chromium, copper, mercury, iron, nickel and selenium. In the case of the St. Johns River Power Park, a two-year variance was granted for mercury, and variances were granted for aluminum, copper and iron for periods in which the background levels are high. Twelve-months variances for construction activities were also given.

Table IV-5. Maximum Chemical Concentrations of Cooling Tower Blowdown and Recommended Concentration Limits, Seminole Electric Cooperative, Seminole 1 Power Plant at Point of Discharge. Source: SECI PPSA (1978).

Parameter	Cooling Tower Blowdown	Recommended Max. Conc.
Total Suspended Solids (TSS)	32.0 mg/ltr	25.0 mg/1
Total Dissolved Solids (TDS)	3740.0 mg/ltr	1000.0 mg/ltr
Sodium	720.0 mg/ltr	680.0 mg/ltr
Magnesium	112.0 mg/ltr	----
Copper	40 ug/ltr	60.0 ug/ltr
Nickel	12.0 ug/ltr	100.0 ug/ltr
Zinc	280.0 ug/ltr	1000.0 ug/ltr
Chromium	80.0 ug/ltr	100.0 ug/ltr
Mercury	2.0 ug/ltr	.05 ug/ltr
Aluminum	600.0 ug/ltr	100.0 ug/ltr
Iron	2240.0 ug/ltr	1000.0 ug/ltr
Manganese	120.0 ug/ltr	1500.0 ug/ltr
Chloride	1600.0 mg/ltr	250.0 mg/ltr
Sulfate	861.0 mg/ltr	---
Residual Chlorine	200.0 ug/ltr	5.0 ug/ltr
Phosphorus	1.0 mg/ltr	1.0 mg/ltr
Oil and Grease	15.0 mg/ltr	15.0 mg/ltr

Table IV-6. Water Quality Variances Granted to TECO for the Big Bend 4 Plant. All figures in miligrams per liter (m/l) unless otherwise marked. Source: TECO BB4 Order.

Pollutant	Variance Max. Conc.	State Class III Marine Standards
arsenic	0.2	0.05
cadmium	0.005	5.0 ug/l
chromium	0.965	0.50 (in effluent)
copper	0.04	0.05
iron	0.001	0.30
mercury	0.007	0.1 ug/l
nickel	0.096	0.1
selenium	0.032	0.025

3. Impingement and Entrainment

One of the more potentially significant environmental impacts of power plant cooling is termed "impingement and entrainment." Entrainment" is the drawing in of plant and animal organisms into the power plant with the cooling water; "impingement" is the damage done to the organisms in the process by being pulled onto screens and other barriers.

Table IV-7 shows the rate of impingement experienced at FPC's Crystal River power plant during 1977-78. At that time, there were three units in operation, two coal units and one nuclear plant; together these three units drew in 1.318 million gallons per minute (19 billion gallons per day) from from the Gulf of Mexico. As seen in this example, the rate of impingement varies markedly with the season. Over the course of twelve months, the three units impinged in a total of about 2.7 million fish, weighing about 12.5 million pounds; and about 719,000 invertebrates, weighing about 3740 pounds.

Table IV-7: Mean 24-hour Impingement Rates, Crystal River Units 1, 2 and 3, 1977-78. Source: FPC Crystal River 4 and 5 EIS (1980). Note: the three units consumed water at a rate of 1.32 million gallons per minute (19 billion gallons per day). All biomass figures in pounds.

	Finfish		Invertebrates	
Month	Number	Biomass	Number	Biomass
Jan.	29,662	132.50	5,179	14.23
Feb.	20,187	43.64	2,961	6.00
Mar.	2,966	37.32	2,771	11.00
Apr.	2,734	14.64	1,015	14.65
May.	737	4.0	345	12.14
June	684	19.82	567	2.82
July	1,071	16.5	2,943	7.64
Aug.	891	9.77	2,749	7.90
Sept.	387	5.23	1,557	17.86
Oct.	568	6.95	651	6.0
Nov.	2,544	18.73	1,852	12.95
Dec.	25,286	99.34	1,047	9.82
24-hr MEAN	7,310	34.0	1,970	10.27
ANNUAL TOTAL:	2,668,150	12,426.6	719,050	3749.54

To mitigate the impact of impingement and entrainment, a number of power plants--including JEA's Northside plant and TECO's Big Bend 4--have incorporated traveling screens near the intake points. The total mortality rate of fish for the St. Johns River Power Park was estimated to be about 0.5% - 0.9% of the fish entering the intake canal. (See Fig. IV-6).

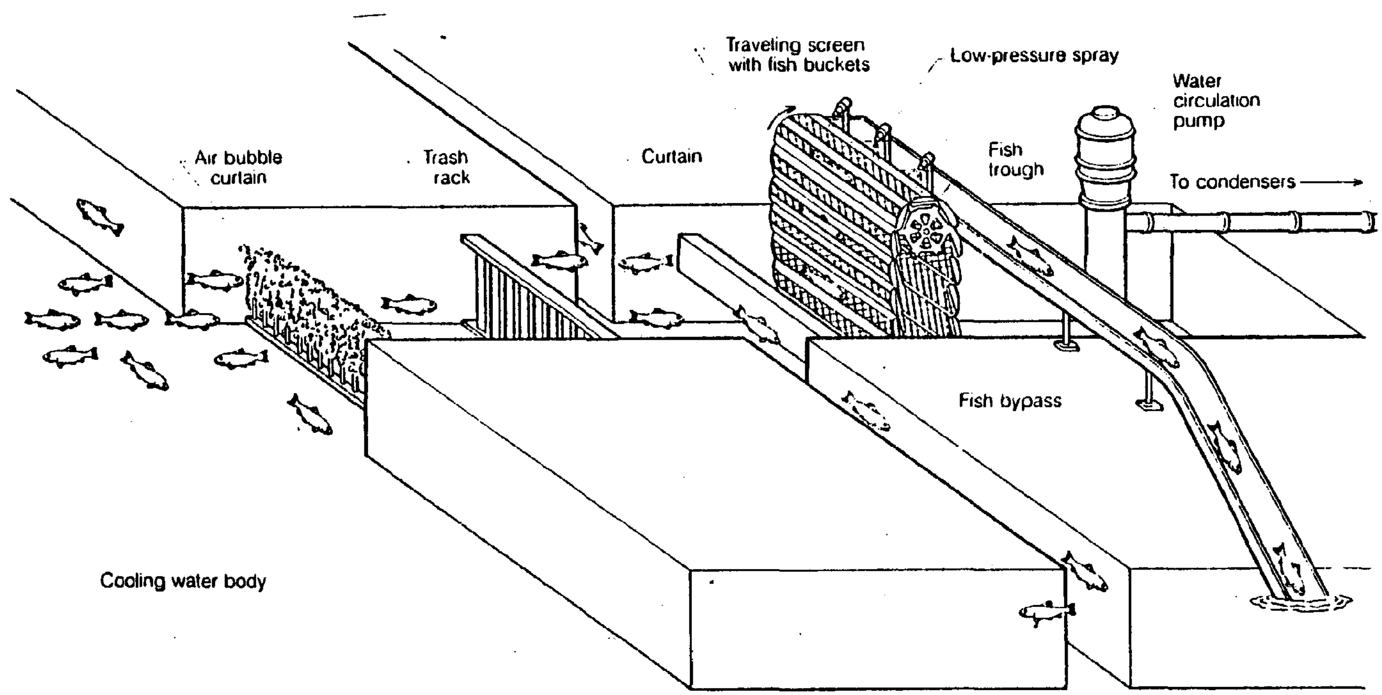
4. Additives: Chlorine and Anti-Corrosives

"Biofouling" occurs when an insulating layer of slime-forming organisms forms on the waterside of the condenser tubes, thus inhibiting the heat exchange process. Chlorination is the most widely practiced method of biofouling control for both once-through and recirculating cooling water systems. The properties of chlorine that make it an effective biofouling control agent are precisely the properties which cause environmental concern. However, the addition of chlorine to the receiving body of water causes the formation of toxic compounds that affect the health of aquatic organisms.

The large amounts of chlorine discharged are reflected in Table IV-5. In this case, at the Point of Discharge, the chlorine level is 200 micrograms per liter (ug/l), compared with the state maximum concentration level of 5.0 ug/l. There have been large numbers of studies completed on the effects of chlorine on aquatic plants and animals. The effects vary markedly from one species to another, and are complicated by a variety of other factors, such as mortality from impingement, the effects of sunlight, the length of time of exposure, and so forth. For a complete treatment of the effects of chlorine buildup in streams, rivers, lakes and bays, see the bibliography below under "Chlorine Discharge."

Corrosion is an electrochemical process that occurs when metal is immersed in water. Most metals rely on the presence of a corrosion product film to impart corrosion protection. As corrosion products form and increase in thickness, the corrosion rate decreases continually until steady state conditions are achieved.

Fig. IV-6: Methods to Minimize Entrainment and Entrapment of Aquatic Species. Source: EPRI (1984).



Corrosion products are more of a problem in cooling tower blowdown than in once-through cooling water discharge. The concentration of pollutants (through evaporation) in recirculating systems probably accounts for most of the difference in the level of dissolved metals observed between once-through discharge and cooling water blowdown.

Chemical additives are needed at some plants with recirculating cooling water system in order to prevent corrosion and scaling. Chemical additives are also occasionally used at plants with once-through cooling water systems for corrosion control. Chemicals added to once-through cooling water to control corrosion or added to recirculating cooling water to control corrosion and scaling will usually be present in the discharges.

5. <u>Salt Drift</u>

Another environmental impact from cooling power plants is that of "salt drift." All cooling towers lose some of the incoming water as evaporation; the "plume" of mist rises from the tower, carrying salt with it, a condition known as "salt drift." The issue of salt drift has been a major question in a number of power plant site certification cases in Florida, particularly those in which the applicant utility sought to use salty or brackish water.

A particularly thorough study of salt deposition in Maryland, at the site of a nuclear power plant which is cooled by salt water, showed that some species of plants can be affected by high salt deposition rates, but that after three years of operation, yields of three crops near the plant "were statistically equivalent to baseline levels."

A lengthy study of the Turkey Point plant by EPA concluded that the environmental impacts of salt deposition at that site were not considered harmful. According to the study, "No measurable effects attributable to salt aerosol emissions from test cooling devices were detected on indigenous plants, soil or fresh water sampled during or following operation." (See Hindawi, et al. 1976.)

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CHAPTER 5

AIR POLLUTION

CHAPTER 5

AIR POLLUTION

Reducing air pollution from fossil-fueled steam-electric plants to acceptable levels is one of the major challenges facing the electric utility industry. The need to resolve air pollution and other environmental problems has a significant bearing on where electric generating plants will be sited, what kind of plants will be built, what fuels will be burned, how much electricity will cost the consumer, and generally whether the electric utility industry will meet the demands for power in coming years.

When a utility applies for certification to construct a coal-fired power plant, the question of the plant's impact on air quality is likely to be a major issue in the certification proceeding. Consequently, local planners can expect to deal with air pollution questions surrounding a proposed plant. Accordingly, this handbook provides planners with an overview of the types of pollutants emitted from coal-fired plants, their health effects, state air quality standards, and the technology available to reduce air pollution.

A. AIR POLLUTION FROM POWER PLANTS IN FLORIDA

Compared to some of the industrial states of the Northeast, Florida has enjoyed relatively clean air. Still, this state has air pollution problems that can be aggravated by a major "point source" such as a power plant. This section examines types of emissions associated with coal plants, and summarizes the air pollution standards currently enforced by the state Department of Environmental Regulation.

1. Air Pollutants from Coal Combustion

There are six types of air pollutants commonly associated with coal-fired power plants: sulfur oxides (SOx), nitrogen oxides (NOx), particulate matter (often referred to as Total Suspended Particulates--TSP); carbon monoxide (CO); carbon dioxide (CO_2) and trace elements (mercury, lead, organic molecules, radioactive particles and others).

Sulfur Oxides--originate during the combustion of sulfur-bearing coal, oil, and to a much smaller extent, natural gas. As seen in Table V-4, over 73 percent of all SO_2 generated in Florida in 1980 originated from electric utilities; other sources included industry (18.9 percent), transportation (4.2 percent), solid waste and heating. The yearly discharge of SO_2 in Florida is over one million tons. (See Part B of this chapter for a discussion of SO_2.

Nitrogen Oxides--are primarily the products of reactions between oxygen and nitrogen in the combustion of fossil fuels in internal combustion engines and furnaces. As seen in Table V-11, in 1980, 44.9 percent of all nitrogen oxides produced in Florida were from transportation and 43.5 percent from electric utilities; industry provided 6.7 percent. The total 1980 discharge in Florida was 773,000 tons. (See Part C for a discussion of NOx).

Particulate Matter--includes fly ash from power plants and industrial plant stacks, soot and ash from other combustion processes, and dust from metallurgical plants, quarrying, and other industrial and agricultural processes. In 1985 electric utilities are projected by the Florida Department of Environmental Regulation (DER) to generate 54,100 tons of particulate matter, representing about 8 percent of the state's total production of 696,800 tons. (See Part D, Particulates)

Carbon Monoxide--as an air pollutant originates primarily in gasoline-fueled internal combustion engines and in other devices burning fossil fuels under conditions of incomplete combustion. According to DER, in 1985 Florida's utilities will generate about 22,500 tons of CO per year, less than 1% of the state's projected total of 2,259,200 tons. Because utilities contribute such a small portion of the total, carbon monoxide will not be given detailed attention in this handbook.

Carbon Dioxide--is not, strictly speaking, a pollutant. However, in recent years attention has focused on the "greenhouse effect," in which a build-up of CO2 in the Earth's atmosphere, resulting from the combustion of fossil fuels, could raise the temperature of the Earth, possibly with profound effects. The contribution of utilities to CO2 production is relatively low. (The "greenhouse effect is treated in detail in Part E, "Other Emissions.")

Trace Elements--include mercury, organic compounds such as dioxin, and radioactive particles. Each of these could be harmful if present at a high enough concentration. Mercury gas is discussed in Part E; radioactivity in Particulates, Part D.

2. Florida Air Quality Regulations

When a power plant site application is received by the Department of Environmental Regulation, it is reviewed to ensure that the proposed plant will be in compliance with the Florida Ambient Air Quality Standards (FAAQS). These standards are contained in Chapter 17-2, Florida Administrative Code (FAC). The regulations are not reproduced in this handbook, but they are easily available from any library or from DER.

The 1970 Clean Air Act required the federal Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS). Two sets of standards were promulgated: "primary standards," established to protect public health; and "secondary standards," to "protect the public welfare from any known or anticipated adverse effects associated with the presence of any known pollutants." To date, NAAQS have been adopted for sulfur dioxide, particulate matter, nitrogen dioxide, carbon monoxide, hydrocarbons, ozone and lead.

Subsequently, the state of Florida adopted the Florida Ambient Air Quality Standards (FAAQS). By law, state standards must be at least as stringent as federal standards, and may exceed federal standards. See Table V-1 for a comparison of state and federal standards. Note that the Florida standards are more stringent than the federal standards for sulfur dioxide and total suspended particulates.

An area with air quality superior to levels mandated by the NAAQS for a particular pollutant is classified as an "Attainment Area" for that pollutant; an area with worse air quality than the NAAQS for a particular pollutant is labeled as a Non-Attainment Area. Areas with air quality cleaner than the NAAQS are regulated by "Prevention of Significant Deterioration" limits on new construction of air pollution sources. At the present time, EPA has established PSD standards for sulfur dioxide and particulate matter only.

Table V-I: Federal and Florida Ambient Air Quality Standards in Effect as of January 1, 1984. Source: DER (1983).

Pollutant	Averaging Time	State of Florida Standard	Federal Primary Standard	Federal Secondary Standard
Carbon Monoxide	8-hour*	10 mg/m^3 (9 ppm)	10 mg/m^3 (9 ppm)	(same as primary)
	1-hour*	40 mg/m^3 (35 ppm)	40 mg/m^3 (35 ppm)	(same as primary)
Lead	Quarterly Arithmetic Mean	1.5 ug/m^3	1.5 ug/m^3	(same as primary)
Nitrogen Dioxide	Annual Arithmetic Mean	100 ug/m^3 (0.05 ppm)	100 ug/m^3 (0.05 ppm)	(same as primary)
Ozone	1-hour†	0.12 ppm	0.12 ppm	(same as primary)
Sulfur Dioxide	Annual Arithmetic Mean	60 ug/m^3 (0.02 ppm)	80 ug/m^3 (0.03 ppm)	——
	24-hour*	260 ug/m^3 (0.1 ppm)	365 ug/m^3 (0.14 ppm)	——
	3-hour*	1300 ug/m^3 (0.5 ppm)	——	1300 ug/m^3 (0.5 ppm)
Total Suspended Particulate	Annual Geometric Mean	60 ug/m^3	75 ug/m^3	(see note)
	24-hour*	150 ug/m^3	260 ug/m^3	150 ug/m^3

* Not to be exceeded more than once per year.
† Not to be exceeded more than an average of once per year over a three year period.

Section 107(d) of the Clean Air Act, as amended, directed each state to submit to EPA a list of NAAQS attainment areas; this list was published by EPA in the Federal Register on March 3, 1978. The Non-Attainment areas in Florida for each pollutant are published in Chapter 17-2, FAC, by the Department of Environmental Regulation. This reference can be consulted by planners regarding any specific county or pollutant, and is referred to in all power plant site certification applications. The Federal Register is available at any library.

The nation is divided into three types of PSD regions: Class I, Class II, and Class III areas. Class I areas have the most stringent standards, and Class III the least stringent. The entire state of Florida, other than the four Federally protected areas shown in Fig. V-1, is designated as a Class II area; there are no Class III areas in Florida. The four protected areas in Florida, designated as Class I, are:

1. Everglades National Park
2. Chassahowitzka National Wilderness Area
3. St. Marks National Wilderness Area
4. Bradwell Bay Wilderness Area (Apalachicola Nat. Forest)

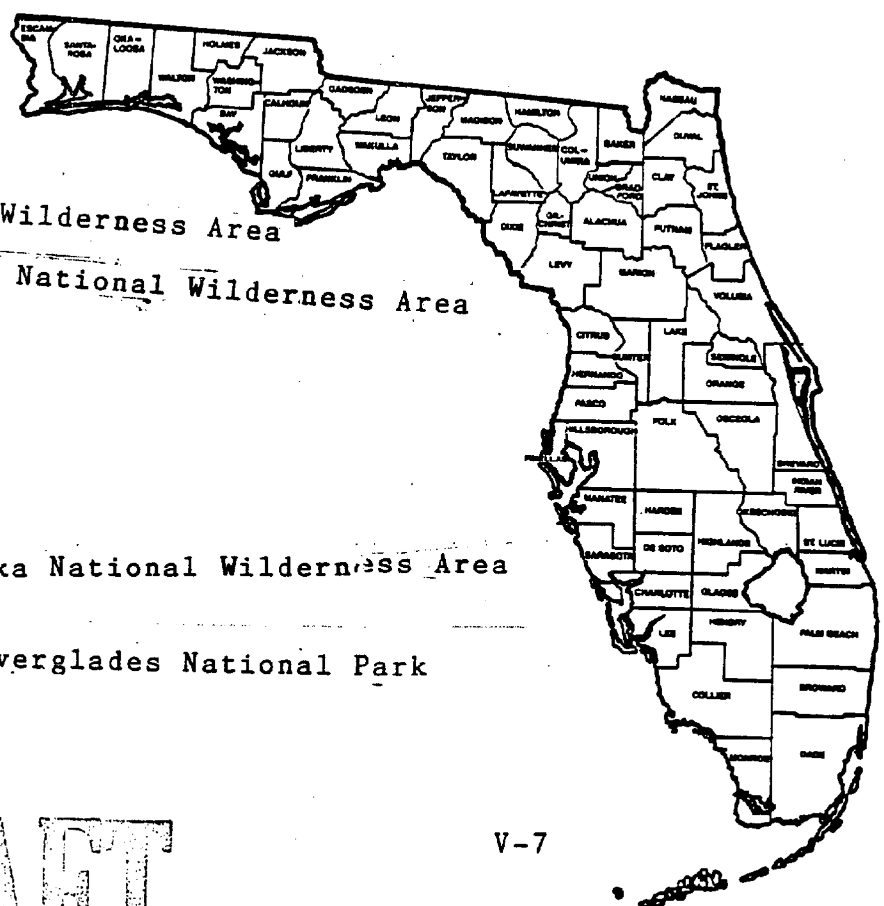
In addition to these four Federally-protected areas, there are two National Wilderness Areas in Georgia -- the Okefenokee NWA and the Wolf Island NWA -- that are Class I areas and must be taken into consideration in siting new power plants in northern Florida. Certifying new pollution sources that could affect a Class I area is governed by special regulations (See Section 17-2.31 FAC.).

Table V-2 shows the Florida PSD maximums for sulfur dioxide and particulates for Class I and Class II areas. The applicable maximum for 3-hour concentrations and 24-hour concentrations may be exceeded only once per year at any site .

Table V-2: Maximum Allowable Concentrations of SO2 and particulate Matter in State of Florida Prevention of Significant Deterioration Class I and Class II Areas. All figures in micrograms per cubic meter (ug/m3).

POLLUTANT/STANDARD	CLASS I AREAS	CLASS II AREAS
PARTICULATE MATTER		
Annual geometric mean	5	19
Twenty-four hour maximum	10	37
SULFUR DIOXIDE		
Annual arithmetic mean	2	20
Twenty-four hour maximum	5	91
Three-hour maximum	25	512

Fig. V-1: Class I Air Quality Areas in Florida.



3. New Source Performance Standards

Part of the DER review of power plant site certification applications is to ensure that the project will not cause a violation of air quality standards. The Florida regulations for new coal-fired power plants adopt prevailing Federal standards by reference in Section 17-2.660 FAC. The federal regulations referred to are contained in Code of the Federal Register, Vol. 40, section 60.40, Subpart D. "Fossil Fuel Steam Generators."

This is the section of Federal regulations that deals with "New Source Performance Standards" (NSPS) for stationary sources--including large power plants (i.e., those consuming fuel at a rate equal to or greater than 250 million Btu per hour). Existing plants are presently covered by less stringent regulations. NSPS standards--given in pounds per million Btu (lbs/MMBtu)--for new coal-fired plants are as follows:

Pollutant	Annual Emission Rate (lbs/MMBtu)
Sulfur Dioxide	1.2
Particulates	0.03
Nitrogen Oxides (for bituminous coal)	0.6
Sulfur Removal	90% (most coals)

When the Department of Environmental Regulation considers an application, it must certify that the pollution control equipment proposed for the new plant is the best available on the market. This is knows as a "Best Available Control Technology" (BACT) review. To make a BACT determination, DER is to consider factors such as competing technologies on the market, the cost of these technologies, and BACT determinations made in other states.

As technology becomes more and more able to reduce pollution in an economical and reliable fashion, BACT standards are made progressively more stringent. Tables V-8 and V-9 provide good examples of the kind of analyses planners need to consider in reviewing technologies on the market to reduce sulfur dioxide. The use of best available control technology allows a new plant to achieve NSPS standards.

As seen in Table V-3, all plants certified in Florida in recent years met the NSPS SO_2 standard of 1.2 lbs/MMBtu; howver, they vary considerably in the margin by which they exceed NSPS.. For example, SECI's Seminole units 1 and 2, are designed to emit SO_2 at a rate very close to the allowable maximum of 1.2 lbs/MMBtu, whereas the JEA/FPL St. Johns River Power Park units 1 and 2 are designed to achieve a rate of .76 lbs/MMBtu. This is shown graphically in Fig. V-2.

These levels of SO_2 reduction can be compared with the coal-fired power plants which went on-line in Florida in the 1960s and the 1970s. As will be seen in Part B below, these plants are much dirtier, emitting SO_2 at rates as high as 4.89 lbs/MMBtu.

Fig. V-2: SO_2 Emission Rates for New and Existing Coal-Fired Power Plants in Florida. Sources: PPSAs.

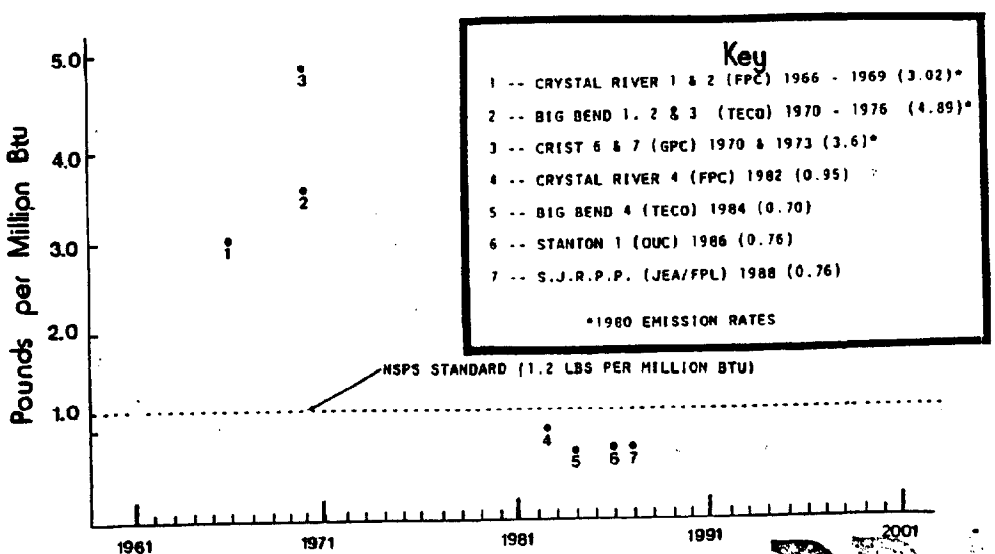


Table V-3: Air Pollution Emission Rates and Control Devices for Recently Certified Coal-Fired Power Plants in Florida. Source: Power Plant Site Applications. Data for SOx/MWH Available Only for Power Plants for which an Environmental Impact Statement was prepared.

PLANT/UTILITY	COUNTY	IN-SERVICE DATE	SO_2 (lbs/MMBtu)	SO_2 FGD	SO_2 Per MWH*	NOx Control	TSP
1. Deerhaven 2 (GVL)	Alachua	1981	N.A.	No	N.A.	No	ESP
2. McIntosh 3 (LAK)	Polk	1982	N.A.	Yes	N.A.	LNB	ESP
3-4. Crystal River (FPC) Units 4 and 5	Citrus	1982 & 1984	3.02	LS	6.92 (@ 66%)	LS	ESP
5-6. Seminole (SECI) Units 1 and 2	Putnam	1983 & 1985	1.15	Yes	N.A.	NSPS	ESP
7. Big Bend 4 (TECO)	Hills.	1984	0.82	Yes	5.79 (@ 75%)	NSPS	ESP
8. Stanton 1 (OUC/LAK)	Orange	1986	1.18	Yes	N.A.	NSPS	ESP&MC
9-10. St. Johns River Power Park Units 1 and 2 (JEA/FPL)	Duval	1987 & 1988	0.76	Yes	2.8 (@ 70%)	NSPS	ESP

NSPS = New Source Performanace Standards
NOx = Nitrogen Oxides
SO_2 = Sulfur Dioxide
*At projected capacity factor.

FGD = Flue Gas Desulfurization
ESP = Electrostatic Precipitator
LS = Low Sulfur Coal

4. Air Quality Modeling

When a power plant site certification application is reviewed by the Deptment of Environmental Regulation, it is subjected to computer-based modeling to determine if it will be in compliance with applicable air quality regulations. The computer model used in Florida is known as the "CRSTER" model. The model provides forecast concentrations for both Total Suspended Particulates (TSP) and SO_2 for 3-hour maximums, 24-hour maximums and average annual concentrations, both from the power plant alone and in combination with other sources of pollution.

A typical computer-generated map resulting from use of the CRSTER model is shown in Fig. V-3. As seen in this example, the maps produced by use of the CRSTER model show projected concentrations of pollutants emitted from the point source as "isopleths"--i.e., lines of equal concentrations.

The air pollution potential of a coal-fired power plant depends on the direction and the dispersion of the "plume" coming from the stack or stacks. As seen in Fig. V-4, how this plume rises and spreads is dependent on a variety of factors, including: the velocity and direction of prevailing winds, the temperature of the gases as emitted from the stack, the amount of the pollutants, local temperatures, local rainfall, the "mixing depth" of the atmosphere, "atmospheric stability," and other such factors. All of these factors, and others, are taken into account in the CRSTER model.

The CRSTER model is not a regional or statewide model; it provides predicted concentration levels for a distance of only 20 kilometers (about 12.4 miles) from the point source. The computer-generated maps produced by the CRSTER program typically show an area only 10 kilometers by 10 kilometers on a side (6.2 miles on a side). However, as shown in Fig. V-5, after a distance of about 5 kilometers from the plant (about 3 miles), the concentration of pollutants tends to become more uniform, so the model provides a useful tool to project the air quality impact of a proposed plant.

While there are numerous other models available, the CRSTER model has been validated in field testing situations; one study found it to give "no systematic pattern of over-prediction or under-prediction."

Fig. V-3: Average Annual Concentration of Total Suspended Particulates in Micrograms per Cubic Meter (ug/m3), TECO's Big Bend 4 Plant. Source: TECO's Big Bend 4 PPSA.

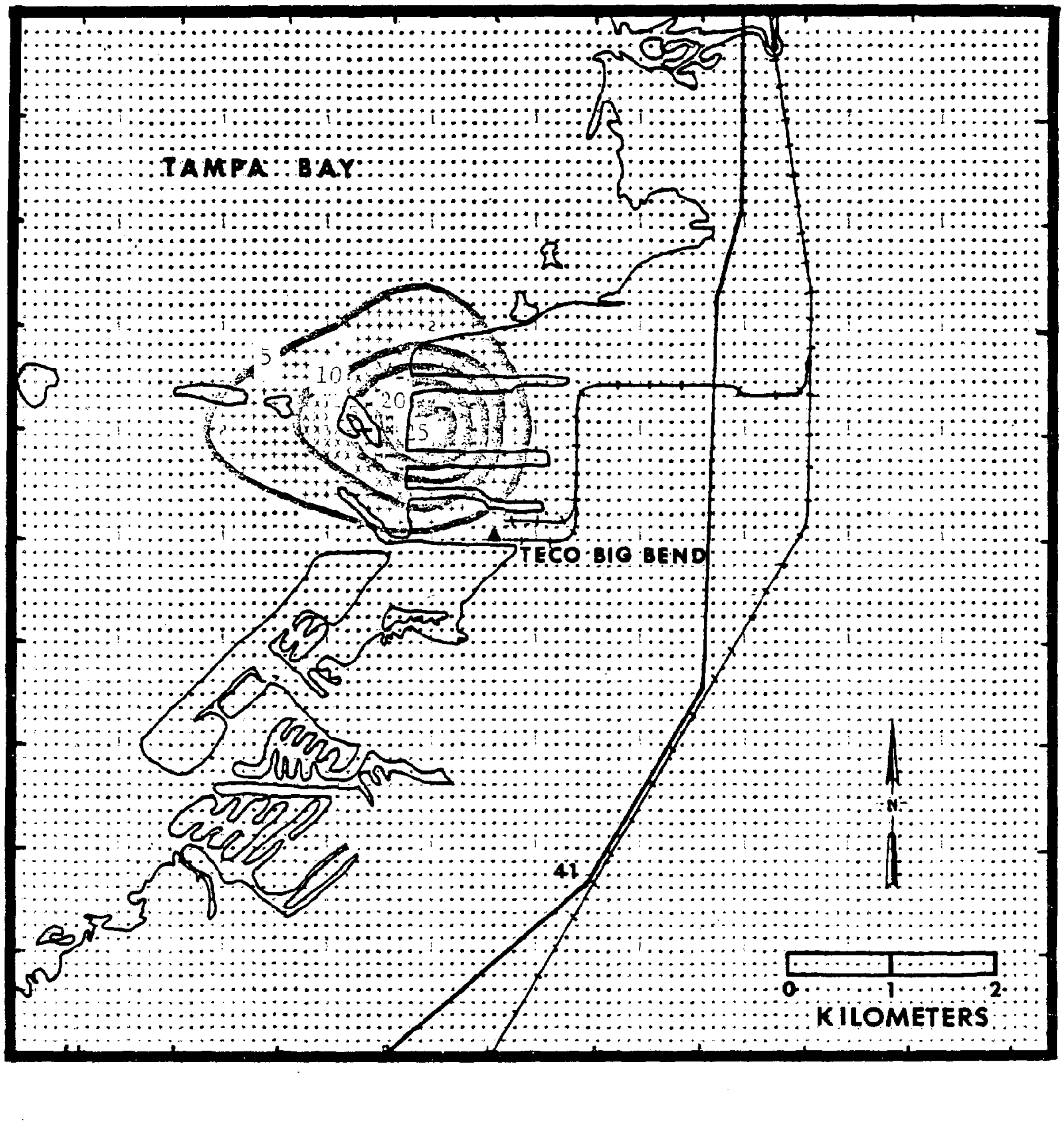


Fig. V-4: Plume Behavior During Constantly Varying Temperature Differentials. Source: Dvorak (1978).

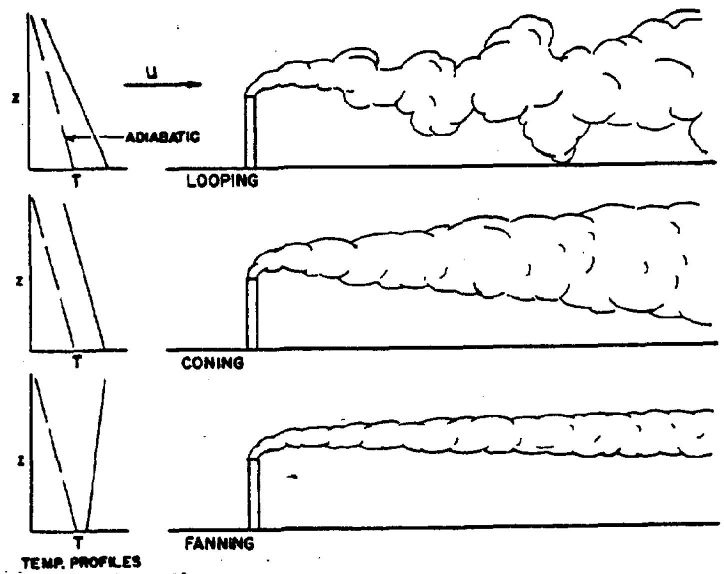
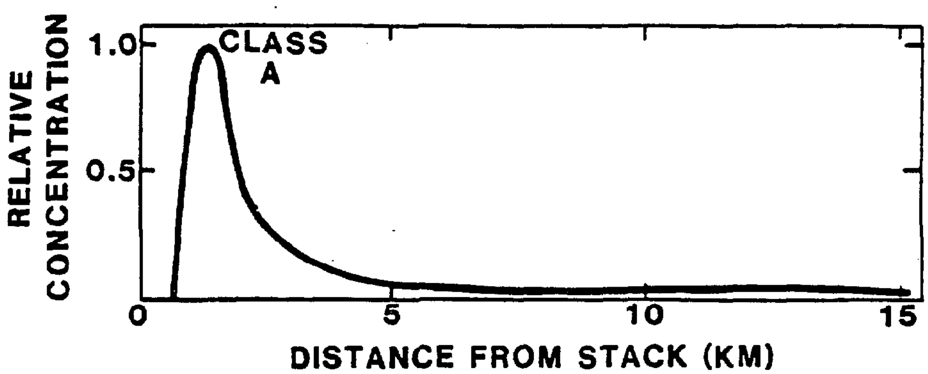


Fig. V-5: Relative Concentration of Tracers Emitted from a Power Plant Stack. Source: Bowne (1981).



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B. SULFUR DIOXIDE

In recent years, the question of sulfur dioxide (SO_2) emissions from power plants has become a heated issue, with SO_2 linked with "acid rain" and adverse health impacts. For this reason, planners reviewing a Power Plant Site Application (PPSA) may wish to give close attention to levels of SO_2 projected to be emitted from a proposed power plant and to the plans of the utility to control SO_2 emissions. This section is designed to assist planners in conducting this type of review.

1. Sources and Amounts of SO_2 in Florida

As shown in Table V-4, in 1980 electric utilities generated 73 percent of all SO_2 produced in Florida. The ten largest sources of SO_2 in Florida in 1980 were all electric utilities; the ten largest industrial sources of SO_2 together were smaller that the largest utility SO_2 polluter, TECO's Big Bend plant in Hillsborough County. Three of the four largest sources of SO_2 were coal plants.

Existing coal-fired plants emit SO_2 at a much higher rate than existing oil-fired units. In 1980, the three-largest coal-fired plants emitted SO_2 at an average rate of 20.04 tons per megawatt-hour (tons/MWH); the five largest oil-fired plants emitted SO_2 at a rate of 8.50 tons/MWH, 60 percent less than the rate of the coal-fired plants. (See Fig. V-5)

New coal-fired power plants presently under construction, however, are much cleaner than ones installed in previous years. All new units will meet federal New Source Pollution Standards of 1.2 pounds of sulfur dioxide per million Btu. (See Fig. Table V-3)

Table V-4: Estimated Emissions of SO_2 in Florida, 1980. Source: ESE (1983).

	Emissions (tons)	Pct
Point Sources		
Utility	742,351	73.2
Nonutility	189,717	18.7
SUBTOTAL	932,068	91.8
Area Sources		
Fuel Consumption	39,533	3.9
Solid Waste	260	.0
Transportation	42,603	4.2
Miscellaneous	360	.0
SUBTOTAL	82,756	8.2
GRAND TOTAL	1,014,824	100.0

Table V-5: Ten-Highest SO_2 Emissions from Utility Sources in Florida, 1980. Source: ESE (1983).

	UTILITY/PLANT	COUNTY	EMISSIONS (TONS)	FUEL*	MWH (1980)*	TONS/ MWH
1.	TECO/Big Bend	Hillsbr.	159,000	Coal	6450.0	24.65
2.	GPC/Crist	Escambia	74,720	Coal	3473.6	21.51
3.	FPC/Crystal Riv.	Citrus	69,400	Coal*	4485.2	15.47
4.	FPC/Anclote	Pasco	56,800	Oil	5012.1	11.33
5.	TECO/Gannon	Hillsbr.	39,800	Coal	5109.0	7.79
6.	FPL/Ft. Meyers	Lee	38,580	Oil	3276.1	11.78
7.	FPL/Sanford	Volusia	34,460	Oil	3999.6	8.62
8.	FPL/Cape Canav.	Brevard	33,190	Oil	4584.1	7.24
9.	FPL/Manatee	Manatee	31,410	Oil	6002.6	5.23
10.	JEA/Northside	Duval	29,870	Oil	N/A	

Average, Coal-Fired Plants = 14.92 tons/MWH

Average, Oil-Fired Plants = 8.84 tons/MWH

*Steam units only.

The levels of SO_2* emissions from new power plants in Florida--as low as .76 lbs/MMBtu for the St. Johns River Power Park near Jacksonville--can be compared with existing plants. As can be seen in Table V-6, the existing plants emit SO_2 at a considerably higher rate.

The number of tons of SO_2 which a power plant will emit depends on the sulfur content of the coal, the use of a flue gas desulfurization unit, the capacity factor of the plant, the size of the plant and so forth. Therefore, projecting emissions from new units is difficult, but can be done: As shown in Table V-3, the Environmental Impact Statements prepared for three new power plants in Florida indicate that the rate of SO_2 emission has been lowered from the projected 4.81 tons per megawatt-hour (MWH) for FPC's Crystal River units 4 and 5, certified in 1978, which do not use flue gas desulfurization, to 2.8 tons per MWH for the St. Johns River Power Park units 1 and 2, certified in 1982, which do use FGD.

One factor which contributes to the emission rate of coal-fired power plants is the sulfur content of the coal burened. In 1980, the average sulfur content of coal as burned in Florida varied from a low of .62 percent for Gainesville utilities to a high of 2.39 percent for TECO (See Table V-7). The cost implications of low sulfur coal, however, are important: According to the industry, low-sulfur coal is expected to cost about 30 to 50 percent more than high-sulfur coal.

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*This chapter speaks only of SO_2 emissions. In actuality, however, both sulfur dioxide (SO_2) and sulfur trioxide (SO3) are produced in a coal-fired power plant. Approximately 97 percent of the sulfur-bearing compounds enter the flue gas as sulfur dioxide (SO_2) gas. For this reason, this handbook deals almost exclusively with SO_2. The small quantities of sulfur trioxide (SO3) which are emitted occur more in the form of an aerosol than a gas. Sulfur trioxide is highly corrosive, since it readily combines with water to form sulfuric acid. Sulfur trioxide is a noxious constituent in a plume and contributes to acid rain.

Table V-6: Sulfur Dioxide Emissions from Coal-Fired Power Plants in Florida, 1980. Source: Florida Electric Coordinating Group.

PLANT/UTILITY*	COUNTY (Yr In-Service)	1980 SO_2 (Th. Tons)	SO_2 (lbs/MMBtu)	Flue Gas Desulf.
Crystal River(FPC) Units 1 and 2	Citrus (1966 & 1969)	69.40	3.02	No
Big Bend (TECO) Units 1, 2 & 3	Hillsbr. (1970, 1973 & 1976)	159.0	4.89	No
Crist(GPC) Units 6 and 7	Escamb. (1970 & 1973)	55.26	3.60	No
Smith (GPC) Units 1 and 2	Bay (1965 & 1967)	19.16	1.76	No

* Does not include small FPL or GVL uses which were not standard power plant uses in 1980.

Table V-7. Coal Consumption and Average Sulfur Content, Florida Electric Utilities, 1980. Source: ESE (1983).

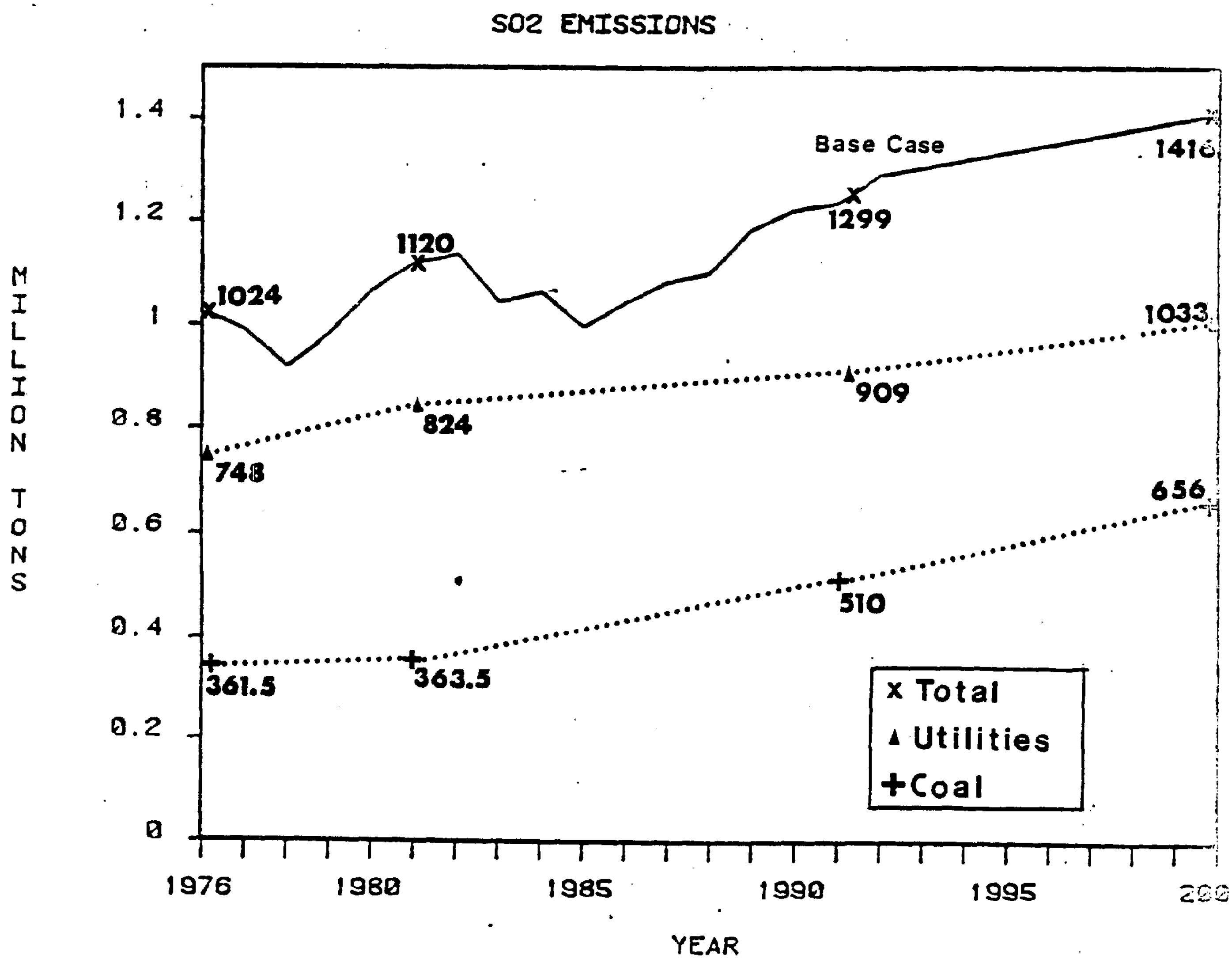
UTILITY	COAL (1000 tons)	Averg. Pct. Sulfur	Th. Tons SO_2
FPL	51	0.70	0.71
FPC	1,920	1.94	74.5
GVL	26	0.62	0.3
GPC	2,840	2.08	118.0
TECO	3,847	2.39	184.0
TOTAL	8,684	2.17	377.0

While projections of SO_2 generation in future years are difficu lt, Fig. V-5A shows the results of a major study on acid deposition in Florida conducted by the Florida Dept. of Environmental Regulation, published in 1984. This DER study forecasts that under current federal and state air pollution control regulations, by the year 2000 the state would be generating about 1.4 million tons of sulfur dioxide annually.

Chapter 1 shows that as of the end of 1983, there were 6300 MW of coal-fired power plants on-line in Florida and that the utiities are projecting that by the turn of the century there may be some 26,500 MW of coal-fired capacity in the state. Assuming today's environmental standards and an average capacity factor of 59 percent, this means that by the year 2000, coal-fired plants in Florida could be generating about 654,900 tons of SO_2 annually. Coal would thus represent about 46 percent of all SO_2 generated statewide in 2001. (See Fig. V-5A)

This projection , shown in Fig., V-5A, assumes today's average rate of 13,210 tons per gross MW per year for newly constructed units, less units retired before 2001.

Fig. V-5A. SO_2 Emissions from Coal-Fired Power Plants in Florida, 1976-2000. Sources: Statewide figures from DER (1984); Coal Plants from DCA (1984).



2. Health Effects of SO_2

Sulfur dioxide is a colorless, nonflammable gas that is emitted into the atmosphere mainly as a result of the combustion of coal and oil. At concentrations from 0.3 to 1.0 parts per million (ppm), equivalent to 780 to 2600 micrograms per cubic meter (ug/m3), SO_2 causes a taste sensation. At concentrations above 3.0 ppm, the gas has a pungent, irritating odor. In the atmosphere, SO_2 is partly converted by photochemical and catalytic reactions to sulfur trioxide, sulfuric acid, and various sulfate particles which , like SO_2, can also cause adverse health effects.*

On the average, SO_2 concentrations in Florida during 1981 were less than 20% of the state's 60 ug/m3 annual average ambient standard. Maximum short-term concentrations (three-hour and 24-hour averages) were also generally much less than the corresponding standard. However, a total of eight 24-hour average SO_2 concentrations in excess of this amount were recorded in that year: five in Duval County, two in Nassau County and one in Escambia County. The only area of the state currently designated a "non-attainment area" for SO_2 in the Florida State Implementation Plan (SIP) is an area north of Pinellas County.

Sulfur dioxide is a pulmonary irritant, affecting primarily the upper respiratory system. An exposure to 1.5 ppm (3900 ug/m3) of SO_2 for a few minutes may produce a reversible constriction of the bronchial tubes in healthy persons, making breathing difficult. When associated with particulate matter, SO_2 becomes an irritant of the lower respiratory system. (For further information on the studies cited here, see the Bibliography, Section 6.)

In experimental animals, chronic exposure to sulfur dioxide produces a thickening of the mucous layer in the trachea and other changes that resemble chronic bronchitis. In animals exposed to SO_2 concentrations of 0.1, 1.0 and 20 ppm, the rate of mucuous transport is decreased owing to inhibition of ciliary motion caused by sulfur dioxide . These adverse effects of SO_2 on defense mechanisms on animals may have important implications regarding response of individuals exposed to other pollutants or pathogenic agents.

*See Glossary, Attachment VI, for definitions of terms.

Exposure of patients with chronic respiratory disease to levels of SO_2 in a concentration of 0.10 - 0.15 ppm for one-half hour to one hour results in decreased pulmonary functions; exposure at this level for one hour decreases the performance of long-distance runners. However, one study found that continuous exposure of guinea pigs and monkeys to 0.1 and 5 ppm of sulfur dioxide for up to one year did not produce any detectable pulmonary effects.

The annual Florida standard for SO_2 is 0.02 ppm (60 ug/m3), and levels in Florida average less than 20 percent of this amount. However, in 1981 eight 24-hour periods in excess of 0.1 ppm (260 ug/m3) were recorded. Still, these levels are generally lower than the concentrations used in the research cited above.

According to the Florida Department of Environmental Regulation, the association between long-term exposure to SO_2 and chronic morbidity and mortality is not clear. Nevertheless, a number of studies have shown that, in areas where average annual concentrations of both total suspended particulates and SO_2 have exceeded about 100 ug/m3, mortality, morbidity and other health-related indices have been higher. A study done at the Oak Ridge National Laboratory estimates that by 1990, the combustion of fossil fuels will cause the deaths of from 110 - 1800 persons per year in Florida, even though Florida's SO_2 level is less than 100 ug/m3.

Similarly, a link between SO_2 and cancer is suspected, but not fully established, by some researchers. See the Winchester reference in the bibliography regarding research on lung cancer and SO_2 levels. A study of smelter workers exposed to SOx appears to link SOx to cancer; the sulfur oxides in this study seemed to serve as a possible promoter rather than a causitive agent. (See Hackney et al., 1983).

3. Sulfur Oxides Control Technology

As shown in Table V-3, all recently-certified coal-fired power plants in Florida are using flue gas desulfurization (FGD) units to reduce the output of SO_2. Flue gas desulfurization systems can be broadly classified in three major categories: (1) throwaway processes; (2) gypsum processes; and (3) regenerative processes. Each of these can also be characterized as "wet" or "dry" systems.

Throwaway Processes--are designed for the eventual disposal of the byproducts as waste. These processes involve wet scrubbing of flue gases for absorption, followed by various methods for neutralizing the acidity and separating the sulfur compounds from the scrubbing liquor. How a typical system works in shown in Fig. V-6.

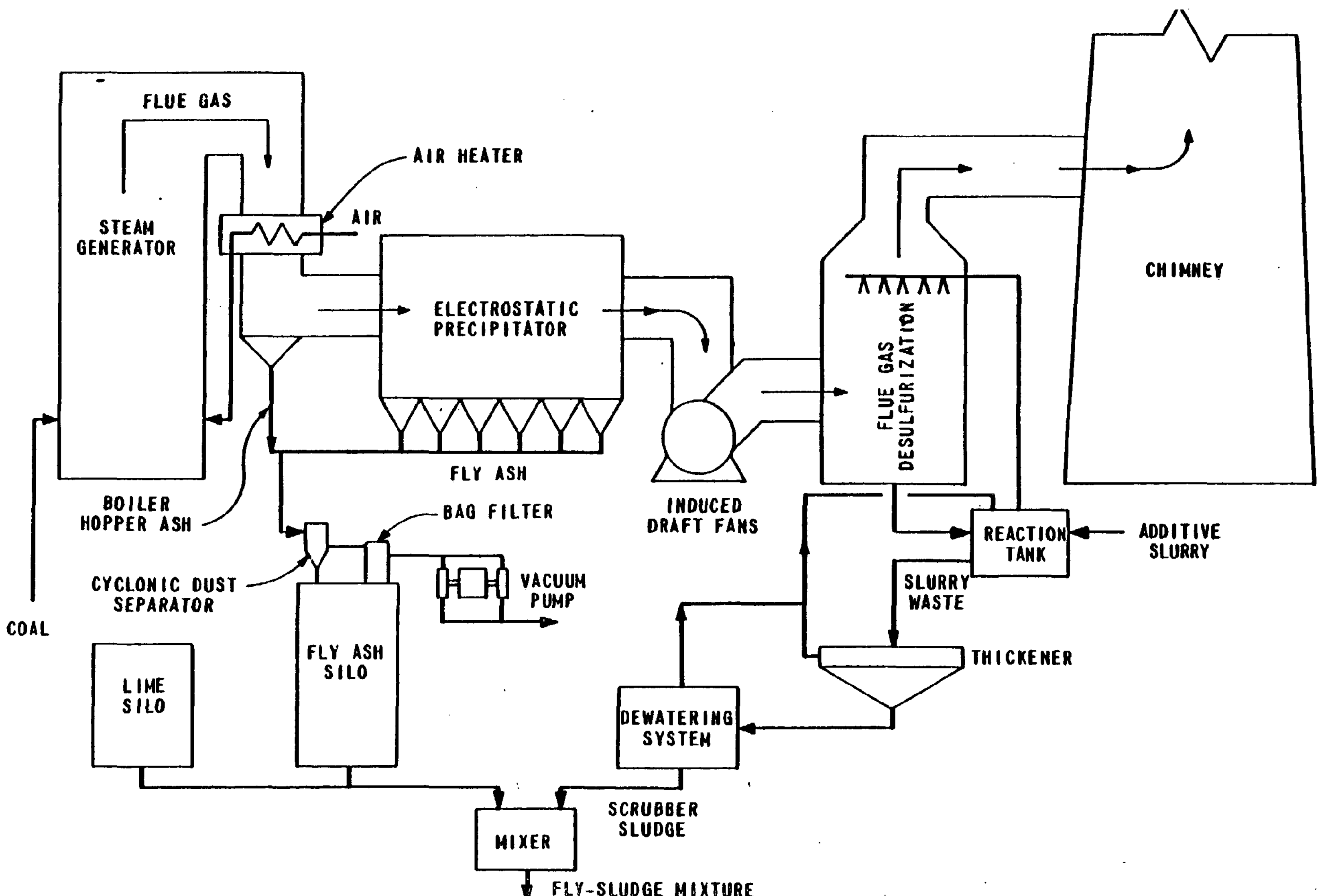
Gypsum Processes--are designed to produce gypsum that may be used in place of naturally occurring gypsum in such products as plaster, wallboard, and cement. This process, like throwaway processes, involves the use of lime or limestone, but includes an oxidation step to insure the recovery of sulfur compounds in the form of gypsum.

Regenerative Processes--are designed to regenerate the primary reactants and concentrate the sulfur dioxide. Further processing can then convert the SO_2 into sulfuric acid or elemental sulfur. These processes include both wet and dry scrubbing.

The efficiencies of these systems vary from 50 percent removal of sulfur up to 92 percent, and some newer systems can achieve a 95 percent reduction when combined with coal washing. A comparison of the costs of these systems in included below in Table V-9.

Overall, wet scrubbers using lime or limestone dominate the market, and according to the utility industry, are expected to to continue to dominate in coming years. According to DER, "On balance, the wet process appears to be better suited to large generating units, even though dry processes release gas at higher temperatures, require less capital investment, and are simpler to operate."

Fig. V-6: Flue Gas Cleaning Flow Diagram. Source: OUC Stanton 1 PPSA.



Of the ten new coal-fired power plants certified to come on-line in Florida in the 1980s, eight have been designed to use wet limestone scrubbing. This type of scrubbing has been the technology of choice among Florida utilities because it is usually the most cost-effective way to achieve BACT standards. Fig. V-7 shows a typical wet scrubber.

As an example, the cost for the wet limestone scrubbing alternative at the St. Johns River Power Park over its life expectancy was estimated to be about $900 million. A lime spray dryer was projected to cost about $1.36 billion over the same time period, 51 percent more, though it would require significantly less energy to operate. (See Table V-8).

As noted earlier, the St. Johns River Power Park's expected SO_2 emission level of 0.76 lbs/MMBtu is relatively low compared with other coal-fired plants in Florida. It is technologically possible to better this performance, but there are significant cost considerations. According to the EIS for this plant, to achieve a level of 0.4 lbs/MMBtu would cost an additional $3 million in capital costs; and because the system would consume more power, it would mean an additional $926,700 dollars per year to operate. Over its life expectancy, the more expensive system was estimated to cost $26.6 million more than the wet limestone process which was certified.

The comparisons shown in Tables V-8 and V-9 show how planners can evaluate one technology against another in terms of SO_2 reduction and cost. However, since it is the Environmental Regulation Commission which sets state air pollution emission standards, the ability of local planners to impact on the degree of stringency required for a plant may be limited.

Fig. V-7: A Typical Wet Scrubber. Source: Babcock and Wilcox.

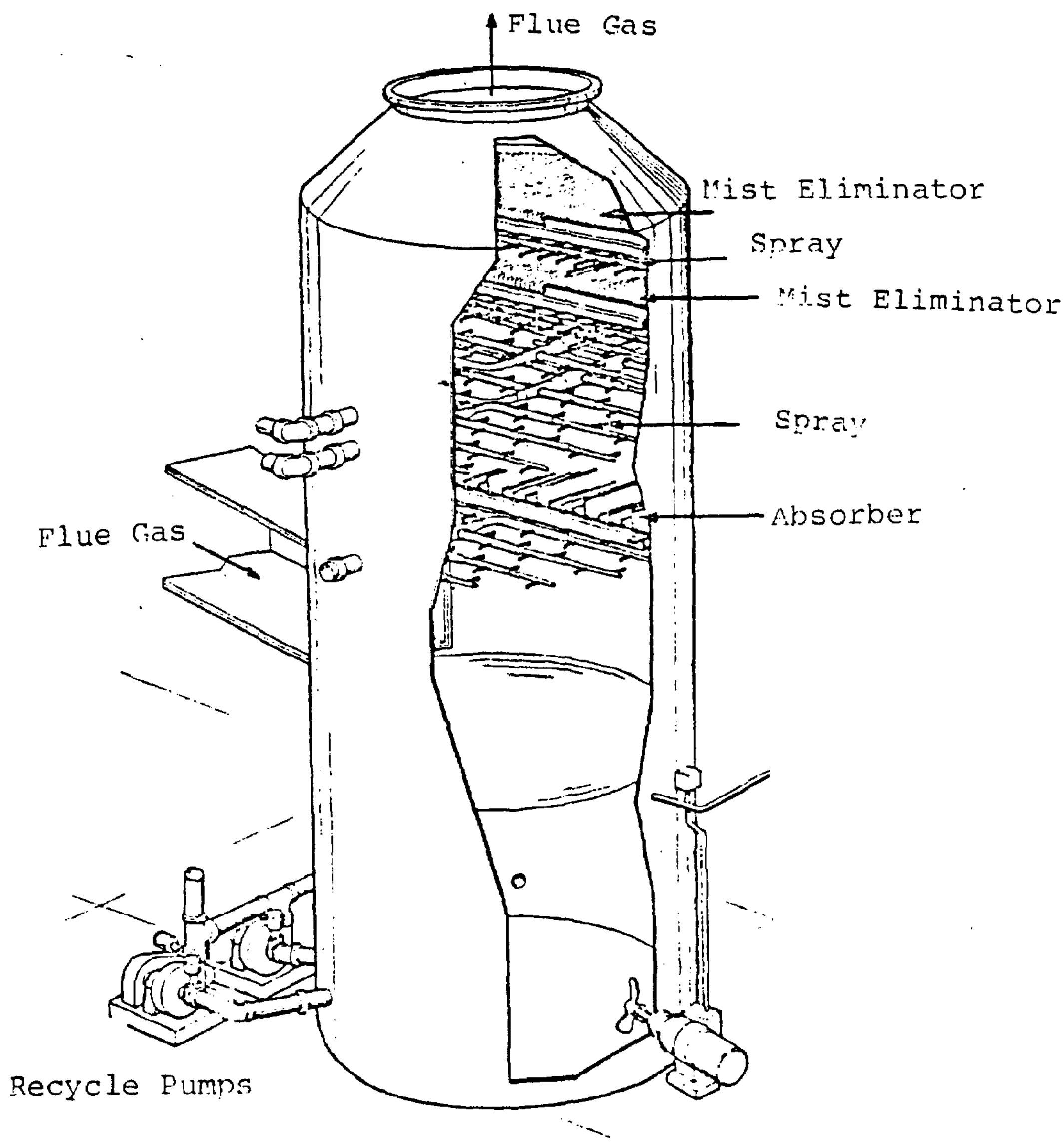


Table V-8: Comparison of Sulfur Dioxide Control Alternatives for the St. Johns River Power Park. Source: EPA SJRPP EIS (1981).

	Cost ($ x 1000)			Equivalent Energy		
System/Control Level	Capital	Annual O&M	Equiv. Annual	Consumption (kw-yr)	Advantages	Disadvantages
1. Lime/Limestone Scrubber (0.76 lb/MMBtu)	283,523	99,997	900,063	24,982	1. Energy consumption lower than System 2 2. Lowest equivalent cost	1. Energy consumption higher than System 3 2. Water consumption higher than System 3
2. Lime/Limestone Scrubber (0.4 lb/MMBtu)	286,267	102,954	926,679	26,047	1. Lowest emission rate 2. Equivalent cost lower than System 3 by $213,834,000	1. Highest energy consumption 2. Sludge generation higher 3. Equivalent cost higher than System 1 by $26,616,000 4. Higher water consumption than System 3
3. Lime Spray Dryer (0.76 lb/MMBtu)	415,487	151,342	1,362,214	15,106	1. Low energy consumption 2. No wet sludge handling 3. Low water usage	1. Cost higher than System 1 by $240,450,000 and System 2 by $213,834,000 2. Not as much operating experience as for lime/limestone scrubber 3. Will not allow production of a usable by-product (gypsum)

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CHAPTER 6

WATER POLLUTION: SOLID WASTES AND COAL STORAGE

CHAPTER 6

WATER POLLUTION: SOLID WASTES AND COAL STORAGE

Large amounts of both solid wastes and coal are stored at a coal-fired power plant. Rainwater passing through these storage areas can become polluted. Water pollution from coal plants has been sharply reduced in newer plants, but has not been totally eliminated.

The purpose of this chapter is to help planners--such as staff of Water Management Districts--to better understand the sources of water pollution from power plants and techniques that can employed to help protect water quality. In addition, the chapter summarizes current Florida water pollution regulations and considers the effect of water pollution on plant and animal life.

A. PRODUCTION AND STORAGE OF SOLID WASTES

This section provides basic information on the types of wastes stored at a coal power plant, the amount of these wastes, and the space needed to store them. In addition, a review of Florida water quality standards is presented.

1. <u>High Volume Wastes at Coal-Fired Power Plants</u>

Solid waste is generated from two major sources at a coal-fired power plant: (1) The largest quantity of solid wastes produced at a coal plant is generated by the flue gas desulfurization (FGD) system; (2) the other major solid waste is coal combustion ash. Collectively, FGD waste and coal ash are called "high volume wastes."*

a. <u>Coal Combustion Ash</u>--is the residue produced by the combustion of coal. It consists of the unburned organic matter and the inorganic mineral constituents present in the coal. The quantity and chemical characteristics of ash depend on the coal, boiler operating conditions, and air pollution control devices.

Two types of ash are produced during combustion: "fly ash" and "bottom ash." Fly ash consists of the finer particles entrained in the flue gas stream; bottom ash is the coarser, heavier material that accumulates in the furnace bottom as loose ash or slag. Fly ash is a valuable, recoverable resource which can be sold as a by-product for a variety of uses.

In coal-burning boilers, some of the fly ash (or "carryover ash") settles in the economizer section of the boiler. This ash, called "economizer ash", typically comprises the larger particles of fly ash.

b. <u>FGD Sludge and Gypsum</u>--In a wet limestone FGD scrubber, sulfur dioxide in the flue gas reacts with a limestone slurry producing a waste which must be removed. "Throwaway" (or "nonregenerative") FGD systems produce large amounts of waste sludge; "regenerative" systems produce calcium sulfite and calcium sulfate (gypsum) which must be stored. The gypsum produced by the FGD system can be of a commercial grade, comparable in quality to natural gypsum deposits, and can be sold commercially. (For more information on FGD systems, see Chapter 5).

*See Glossary, Attachment VI, for definitions of terms.

Other solid wastes, generated on an infrequent basis by a coal plant, include sludges from the sedimentation ponds, storm-water retention basins, cooling towers, and wastewater treatment facilities. Only comparatively small quantities of these wastes are produced.

2. Amounts of Solid Wastes

The amounts of wastes generated by a coal-fired power plant depend on the type of coal being burned, the type of boiler, the type of FGD unit, and so forth. Table IV-1 provides projected amounts for three typical units: SECI's Seminole units 1 and 2, TECO's Big Bend 4 and OUC's Stanton unit 1. FPC's Crystal River units 4 and 5 do not have a flue gas desulfurization system, and therefore produce substantially less wastes than these plant--but far more air pollution.

As seen in Table VI-1, the total amount of solids generated by TECO's 486-MW Big Bend 4 is projected to be about 357,400 tons per year; OUC's 460-MW Stanton 1 is projected to generate somewhat less: 265,400 TPY. SECI's two 650-MW Seminole units together are expected to generate about 811,000 tons per year. When adjusted for tons per gross MW of capacity per year, the average for these four boilers is slightly over 9000 tons per megawatt per year.

To put this amount in perspective, it can be estimated that SECI's Seminole units 1 and 2 together will produce somewhat more than the equivalent of a trailer-truck of waste every two hours This represents about 13.5 truckfuls per day, almost 5000 truckfuls per year.

In these three examples, solid waste from flue gas desulfurization units (FGD) was by far the highest amount: At OUC's Stanton 1 FGD sludge represents 76 percent of all solid waste; at SECI's Seminole 1 and 2, 67 percent; and at the TECO Big Bend 4 site, 59 percent. Fly ash at the Seminole plant represents 23% of wastes and 29% at TECO's Big Bend 4.

Table VI-1. Projected Quantities of Solid Wastes from Three Typical Coal-Fired Power Plants in Florida. Source: TECO 's Big Bend 4 EIS (1982); OUC's Stanton PPSA (1982); and SECI Seminole Units 1 and 2 PPSA (1978).

Plant/Process (and Gross MW)	Amount (Tons/Yr)	Tons/MW/Yr	Pct
OUC Stanton 1* (460 MW)			
Pulverized Rejects	3,800	8.26	1.4
Bottom Ash	12,200	26.52	4.6
Fly and Boiler Hopper Ash	48,400	105.22	18.2
Scrubber Solids	201,000	436.96	75.7
TOTAL	265,400	576.96	100.0
TECO Big Bend 4** (486 MW)			
Bottom Ash	25,680	52.84	7.2
Pyrites	19,000	39.09	5.3
Fly Ash	102,700	211.32	28.7
Gypsum	210,000	432.10	58.8
TOTAL	357,380	735.35	100.0
SECI Seminole Units 1 and 2*** (1300 MW)			
Bottom Ash	79,200	60.92	9.8
Economizer Fly Ash	neg.	neg	neg
Precipitator Fly Ash	185,800	142.92	22.9
FGD sludge	546,000	420.00	67.3
TOTAL	811,000	623.85	100.0

*Assuming Illinois Coal
**Assuming average capacity factor of 52.57 percent; assumes bottom ash is 80% and fly ash is 20% and ash content is 13.5 percent.
***Assumes 66 percent Capacity Factor

3. Storage of Solid Wastes

To store this solid waste consumes large amounts of land area. Over an operating life expectancy of thirty years, the OUC Stanton 1 plant may require 78 acres (312 acres if all four units are built). The JEA/FPL St. Johns River Power Park is likely to require 531 acres of landfill.

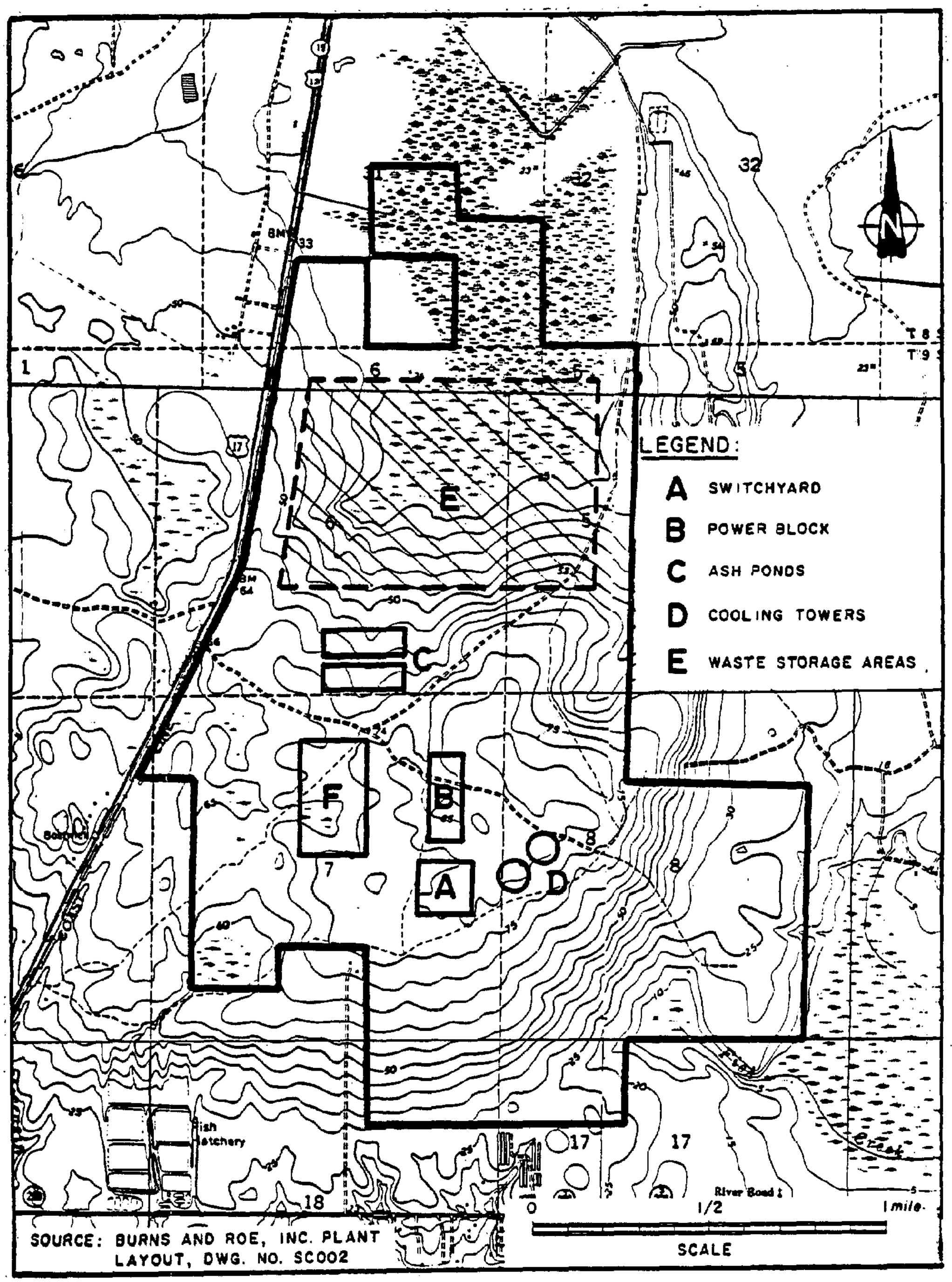
Over the life expectancy of the plant, solid wastes from SECI's Seminole units 1 and 2 are projected to cover 267 acres (about one-half square mile) spread to a depth of 68 feet. This represents an estimated 18, 150 acre-feet of wastes. (An "acre-foot" is one acre spread to a depth of one foot.) The land required for this amount of storage is shown in Fig. VI-1.

The amount of land needed for solid waste storage in three recently-sited power plants in Florida is shown in Table VI-2. Note that the the number of acre-feet per gross megawatt varies substantially. This is because some flue gas desulfurization systems produce far more waste products than others.

Table VI-2: Size of Landfill Needed at Four Major Coal-Fired Power Plants in Florida. Source: PPSAs.

PLANT	Gross MW	Acre/Ft Per Yr	Total Size After 30 Yrs Acres	Acre-Feet	Acre-Ft/MW
SECI Seminole Units 1 and 2	1300	600	N/A	18150	13.96
OUC Stanton 1	460	174	78	5220	11.35
St. Johns Rive Power Park Units 1 and 2	1280	1062	531	31860	24.89

Fig. VI-1. Layout of Major Station Facilities, Including Landfill and Ash Ponds, SECI's Seminole Units 1 and 2. Source: SECI Seminole Units 1 and 2 PPSA (1978).



The waste material is usually placed into an on-site, monitored landfill, developed in cells. The landfill is constructed on compacted material, above the high water table. A diagram of a typical landfill cell is shown in Fig. VI-2. At the St. Johns River Power Park, cells will be 10 acres each, filled to a height of 60 feet.

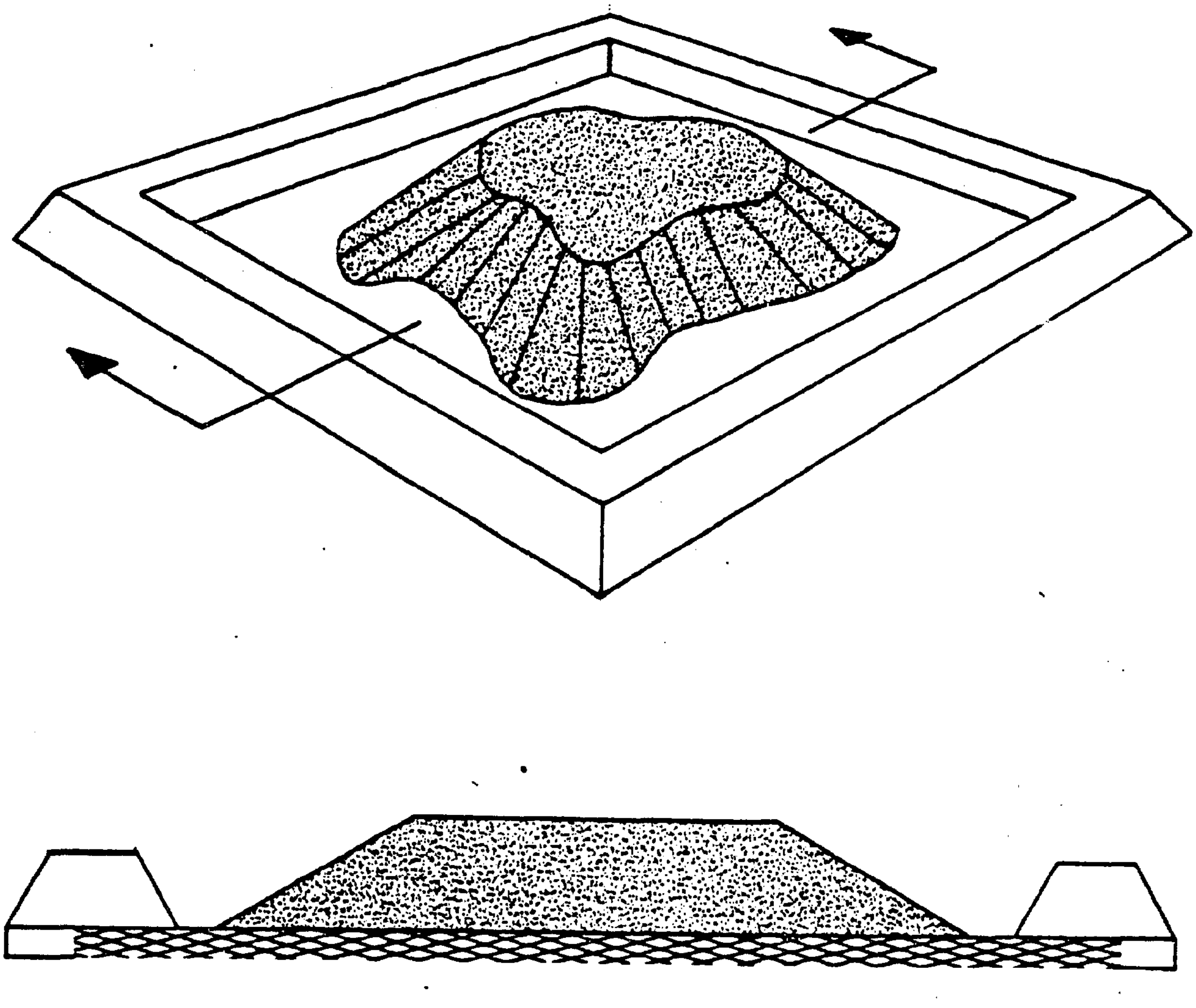
Before the wastes are first placed in a cell, dikes (or "diversion berms") are constructed to divert water runoff into a sedimentation pond. In addition, a perimeter ditch inside the berm is constructed to collect rainwater runoff from the landfill. Collected runoff water is then treated before disposal.

A system of groundwater monitoring wells is installed before the waste material is placed in the cell, and a monitoring program is begun. The system includes wells "upgradient" and "downgradient" of the disposal area. Water levels are routinely monitored, and water samples are collected periodically for analysis.

Fugitive dust emissions from the waste site can be held to a minimum. The continuous placement and compaction of new (moist) material over the old wastes helps prevent the formation of dust. Covering the landfill with soil and seeding it after it is filled eliminates possible future dust production after it is closed.

When the cell is filled, it is closed to the elements. The waste materials are first covered with a granular base (such as bottom ash) and then topsoil is placed on the top and sides of the cell. The tops of the completed cells are sloped to improve surface runoff and reduce infiltration. Interfacing side slopes of the cells are not covered. The final step in closing a cell is to seed the topsoil.

Fig. VI-2. Diagram of a Typical Landfill Cell Showing Berms and Drainage Trenches. Source: OUC's Stanton 1 PPSA (1981).



4. Florida Water Quality Standards

The storage of solid wastes and coal at a power plant represents a potential source of water pollution. Consequently, when a power plant site application (PPSA) is received by the Department of Environmental Regulation, the plans of the utility are reviewed to determine if the proposed project will comply with the state's water quality regulations. This section reviews those standards which were in effect as of January 1, 1984. Standards are different for "surface waters" and "ground water," so these two types of water are dealt with separately here.

The water quality standards of Florida are contained in chapter 17-3, Florida Administrative Code. These rules are not reproduced in this handbook, but are easily available from any library or from the DER public affairs office. The water quality regulations include minimum criteria for all waters, thermal standards, chemical standards for various classes of groundwaters and surface waters. (Thermal standards are discussed in Chapter 4 .)

The water quality criteria require that all waters at all places and at all times be free from man-induced discharges that:

-- Form "putrescent" deposits
-- Float as debris, scum or oil nuisances
-- Produce color, odor, taste, turbidity, or other nuisances
-- Are acutely toxic
-- Cause concentrations that could cause cancer or adverse genetic effects
-- Pose a serious danger to public health, safety, or welfare.

Note that "turbidity" means containing suspended particles, causing the water to be dirty, muddy, discolored or opaque. "Acutely toxic" is defined as a concentration of a substance greater than 1/3 of the concentration of that substance that will kill 50 percent of a test biological organism within 96 hours. This is referred to in power plant siting applications as "LC50." "Putrescent" means containing rotten or decayed materials.

a. Surface Water Regulations--There are five classifications of surface waters which apply to all surface waters other than "mixing zones." A mixing zone is a volume of water around a discharge of pollutants within which concentrations of pollutants above standards are diluted by mixing with the "ambient" water (i.e., the water as found in in the environment). In coal-fired power plants, "mixing zones" are often allowed at the outlet where the cooling tower blowdown is released, and, if separate, in the runoff from the coal storage pile, as shown in Fig. VI-3.

Surface waters are classified on the basis of the highest intended usage:

Class I-A Waters--are those used as a supply of "potable" (i.e., drinking) water.

Class II Waters--are those designated for shellfish harvesting or propagation of shellfish.

Class III Waters--are for recreation and propagation and management of fish and wildlife. Most of the waters in Florida are Class III. Most power plants discharge water into Class III water.

Class IV Waters--are used for agriculture and industrial water supplies.

Class V Waters--are intended for navigation, utility and industrial use. The Fenholloway River near Perry is the only Class V water in Florida.

Certain waters of the state are designated as "Outstanding Florida Waters." These waters include surface waters around or in federal or state parks, wildlife refuges, wilderness areas, environmentally endangered lands, aquatic preserves, National Seashores, and Marine and Estuarine Sanctuaries.

The water quality standards for each class are given in Ch. 17-3, FAC.

The heavy metals found in water discharged from coal-fired power plants are of particular concern. These metals include aluminum, arsenic, cadmium, chromium, copper, cyanide, iron, lead, mercury, nickel, selenium, silver and zinc. These can be found in concentrations high enough to exceed the Chapter 17-3 standards in the mixing zone; when they exceed the state standards outside the mixing zone, applicant utilities have often requested variances from the state standards. Examples of this include the variances granted to TECO for the Big Bend 4 plant, and to JEA/FPL for the St. Johns River Power Park.

Chlorine is found primarily in cooling water discharges due to its use as a biocide or antifouling agent in the cooling system, but minor amounts of chlorine may be discharged from on-site sewage treatment plants.

b. Groundwater Standards--All groundwaters in the state are classified into one of four classes on the basis of designated use:

Class G-I: Potable water use, groundwater in "single source aquifers" (i.e., the only source of drinking water in the area) which has a "Total Dissolved Solids" (TDS) content of less than 3,000 milligrams per liter (mg/l).

Class G-II: Potable water use, groundwater in aquifers which has a TDS content of less than 10,000 mg/l, unless otherwise classified by the Environmental Regulation Commission (ERC), the commission which sets regulatory standards that DER administers.

Class G-III: Non-potable water use, groundwater in unconfined aquifers which has a TDS content of 10,000 mg/l or greater, or which has a TDS content of 3,000 - 10,000 mg/l and either has been declared by the ERC as having no reasonable potential as a future source of drinking water, or has been designated by DER as an "exempted aquifer."

Class G-IV: Non-potable water use, groundwater in confined aquifers which has a total dissolved solids content of 10,000 mg/l (milligrams per liter) or greater.

All groundwater must be free from domestic, industrial, agricultural, or other man-induced discharges in concentrations which alone or in combination with other substances are:

--Harmful to plants, animals, or organisms that are native to the soil and responsible for treatment or stabilization of the discharge permitted by the Department of Environmental Regulation; or

--Carcinogenic*" (cancer causing), "mutagenic" (causing mutations), "teratogenic" (causing birth defects) or toxic to human beings, unless specific criteria are established for such components in 17-3.404; or

--Acutely toxic to indigenous species of significance to the aquatic community within surface waters affected by the groundwater at the point of contact with surface waters; or

--A serious danger to the public health, safety, or welfare; or which create or constitute a nuisance.

Classes G-I and G-II are also required to meet the primary and secondary drinking water quality standards for public water systems as listed in Chapter 17-22, Florida Administrative Code. When the natural "unaffected" background quality of the groundwater exceeds the drinking water criteria, the "representative background" would be the standard for Classes G-I and G-II.

*See Glossary, Attachment VI, for definitions of terms.

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B. WATER POLLUTION FROM STORED SOLIDS

Water pollution at a power plant can occur when rain water passes through stored wastes or drains from coal storage piles. This section identifies the pollutants associated with the storage of wastes and coal, and compares the constituents in water runoff from coal power plants with Florida's water quality standards.

1. Water Pollution from Stored Wastes

As described earlier in this chapter, a typical coal-fired power plant may include hundreds of acres of landfill storage for wastes such as bottom ash, fly ash, and flue gas desulfurization sludge. Seepage of water through the wastes can transfer pollutants from ash and FGD sludge into the adjacent soil. This process is called "leaching."

"Leachate" may be defined as the liquid that has "percolated" through or drained from waste or other materials, and contains soluble, partially soluble, or "miscible" components removed from these materials. Both "vertical" and "lateral" seepage of leachate can occur from ash and sludge waste-storage sites, particularly where the waste material is deposited as a slurry. The major impact of seepage is the addition of pollutants to groundwater and soil resulting in the potential contamination of water supplies for both humans and wildlife.

The chemical characteristics of wastewater draining from ash storage areas are a function of the inlet (or "makeup") water, composition of the fuel burned, and the composition of other wastewaters discharged into the ash settling ponds. Table VI-3 shows the projected chemical characteristics of the storm water runoff at SECI's Seminole plant, compared with the Florida's groundwater standards in effect in 1978.

The concentrations shown in this example are at the point of discharge (POD) in the St. Johns River. As the pollutants are carried away by the river, they of course become diluted to much lower concentrations. Fig. VI-3 shows the decreasing levels of concentrations projected in the Power Plant Site Application (PPSA) for the Seminole plant.

As is seen in this example, a majority of the hazardous leachate elements are trace metals: aluminum, copper, chromium, mercury, selenium, zinc, and others. In most cases the concentration of these elements in the sludge at the point of discharge (POD) is in excess of state water quality standards that were in effect at the time the plant was certified.

In addition to trace metals, leachate contains organic compounds (i.e,, those containing carbon). Table VI-4 lists the concentrations of organic emissions from the holding pond at a typical 1000 MW coal-fired power plant. Of these compounds, only phenol, with a concentration of 97 micrograms per liter (ug/l) was reported to be present at a dangerous concentration. The EPA has established a maximum concentration for phenol for health of 5 ug/l and for the environment of 100 ug/l; phenols have been found to be both mutagenic and carcinogenic.

The 1984 Legislature amended water discharge standards for power plants. Planners should bear in mind the special exemption for power plants in reviewing a PPSA.

Table VI-3: Concentrations of Chemical Constituents in Flue Gas Desulfurization Sludge, SECI Seminole Units 1 and 2 at the Point of Discharge (POD). Source: SECI Seminole 1 and 2 PPSA (1978).

Scrubber Constituents	Sludge Concentration Range Liquors;mg/l	Solids;mg/kg	Class I-B Water Quality Criteria (mg/l)
Aluminum	0.03 - 2.0	-[a]	
Arsenic	0.004 - 1.8	0.6 - 52	0.05
Beryllium	0.001 - 0.18	0.05 - 6	
Cadmium	0.004 - 0.11	0.08 - 4	0.01
Calcium	10 - 2600	(10.5) - (26.8)[b]	
Chromium	0.0011 - 0.5	10 - 250	0.05
Copper	0.002 - 0.56	8 - 76	
Lead	0.005 - 0.52	0.23 - 21	0.05
Magnesium	0.1 - 2750	-	
Mercury	0.00005	0.001 - 5	0.002
Potassium	5.9 - 760	-	
Selenium	0.0006 - 2.7	2 - 17	0.01
Sodium	10.0 - 29,000	(3.7)	
Zinc	0.001 - 0.59	45 - 430	
Chloride	420 - 33,000	(0.9)	
Fluoride	0.6 - 58	-	1.5
Sulfate	600 - 84,000	(3.5) - (47.3)	
Sulfite	0.9 - 3500	(0.2) - (69.2)	
TDS	2800 - 162,700[c]		
pH	4.3 - 12.7		

[a]Not analyzed.

[b]Parentheses indicate percent weight.

[c]Typical maximum: approximately 10,000 (see Section 5.1.1.2.2).

Fig. VI-3: Concentration of Chemical Pollutants Released by SECI's Seminole Units 1 and 2 into the St. Johns River. Note: Isopleths show percentage of original concentration at point of discharge (POD). Source: SECI's Seminole Units 1 & 2 PPSA (1978).

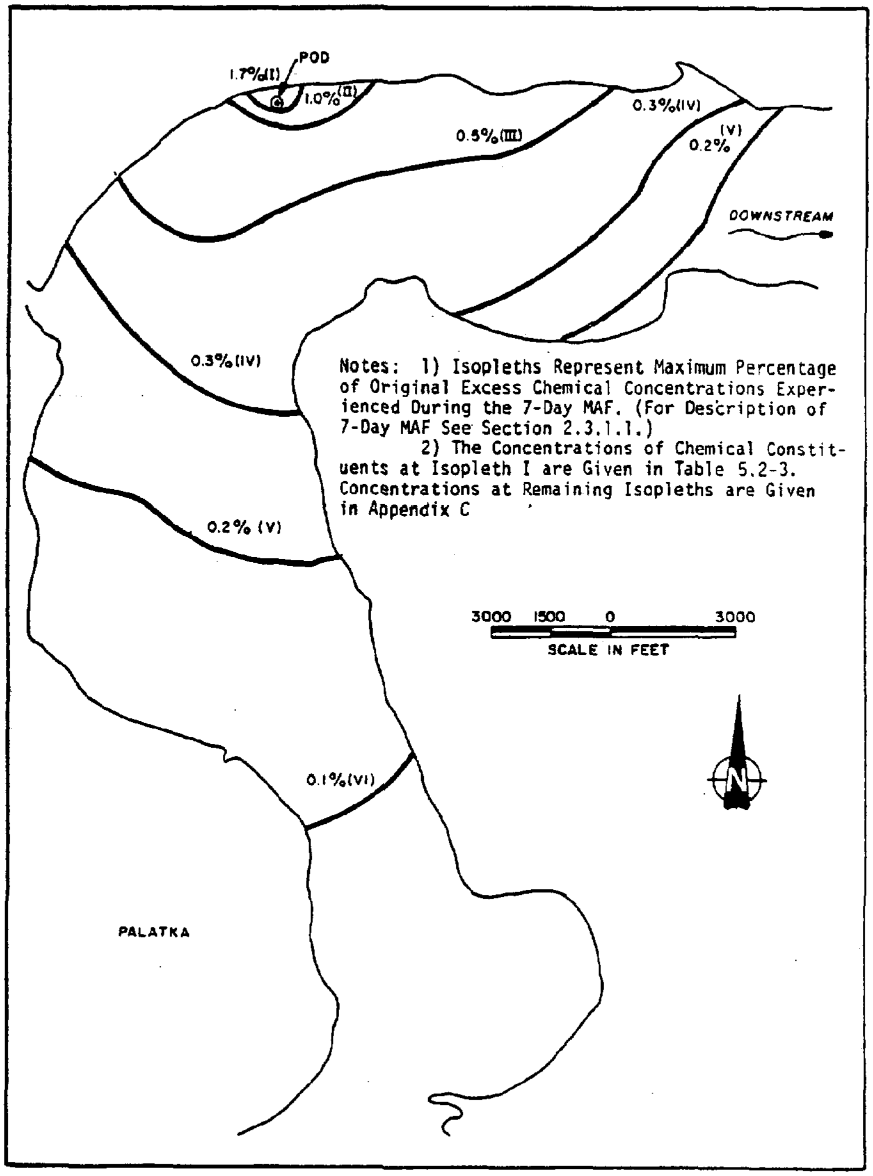


Table VI-4: Concentration of Organic Chemicals in Surface Runoff Water from a Holding Pond at a Typical 1000 MW Coal-Fired Power Plant. Source: Rosecrance and Colby (1980).

Chemical	Concentration (μg/l)	Kg/day(1)
Methylene chloride	17	0.48
Chloroform	6	0.17
1,1,1-Trichloroethane	1	0.028
Benzene	2	0.056
Toluene	6	0.17
Phenol	97	2.7
Oil and Grease	5000	140
TOTAL	5000	140

(1) Assumes runoff of 28×10^6 l/day

2. Water Pollution from Coal Storage

Coal-fired power plants typically maintain a 90-day supply of coal. Water pollution from coal pile storage is a function of the type of coal, the amount of time the water stays in the coal-storage area, the amount of rainfall and the mitigative measures employed. Therefore, pollution will vary considerably with such factors as the amount of rainfall, the type of liner under the coal pile, and the type of holding pond the utility constructs to catch the runoff before it enters surface water or ground water.

The concentration of pollutants is inversely related to the water flow--meaning that the faster the rate of water movement, the less contact the coal has with the water, and the less the contamination. Studies of coal pile leachate show a marked variance from one site to another.

A 1978 study by Wachter and Blackwood for the U. S. Environmental Protection Agency, concluded that average coal pile runoff concentrations were not large enough to approach hazardous levels. However, the researchers concluded that:

> Adverse impacts on aquatic biological life and water quality are generated by increases in suspended sediments and acidity. Coal minerals containing calcium and magnesium produce undesirable alkalinity and hardness in waters. Ferrous bicarbonate may also form, consuming oxygen and creating a bitter taste.

The results of this study are shown in Table VI-5. Note that in this example, "hazardous concentration" is a term used by EPA and may not necessarily reflect Florida water quality standards. The Wachter and Blackwood study found that all pollutants from coal pile runoff were less than one percent of "hazardous levels" except for selenium (20 percent), nickel (3 percent), and arsenic (2 percent).

Table VI-5: Hazardous and Runoff Concentration Levels for Inorganic Pollutants From Coal Storage Areas. Source: Wachter and Blackwood (1978). Note that CR is the concentration of pollutants in runoff; CH is the hazardous concentration; and C_R/C_H is the ratio of these two factors.

Effluent	Runoff concentration, g/m^3	Hazardous concentration, g/m^3	C_R/C_H ratio
Antimony	0.0004	0.225 (40, 43)	0.0018
Arsenic	0.001[a]	0.05 (44)	0.02
Asbestos	0.001	0.63 (40, 43)	0.0016
Beryllium	NDL[b]	0.011 (44)	–[c]
Cadmium	2×10^{-7}	0.01 (44)	0.00002
Chromium	4×10^{-7}	0.05 (44)	0.000008
Copper	$<7 \times 10^{-6}$	1.0 (44)	0.000007
Cyanides	7×10^{-7}	0.005 (44)	0.00014
Lead	6×10^{-6}	0.05 (44)	0.00012
Mercury	1×10^{-7}	0.002 (44)	0.00005
Nickel	4×10^{-5}	0.0013 (44)	0.031
Selenium	0.002	0.01 (44)	0.2
Silver	NDL[b]	0.05 (44)	–[c]
Thallium	NDL[b]	0.008 (41, 43)	–[c]
Zinc	7×10^{-5}	5.0 (44)	0.000014

[a]Free silica concentration.

[b]No detectable level.

[c]Not calculated.

3. The Chemistry of Leachate Contamination

The danger to plant and animal life of "leachate" from a coal power plant depends on a variety of factors, including the material being leached, its concentration, the amount of rainfall, the "permeability" of the soil, and the physical characteristics of the soil beneath the storage area.

a. Permeability--is a measure of how easily water will pass or flow through a material and is thus an important factor in determining the volume of leachate that can drain through the material. Permeability in a landfill is usually measured in "centimeters per second." A low permeability may be in the order of 1 x 10-6 centimeters per second; this is the same as .000001 cm/sec or 0.32 meters per year. A much higher permeability would be, for example, 1 x 10-4 cm/sec (i.e., .0001 cm/sec).

At the FPL/JEA St. Johns River Power Park, for example, the permeability of the landfill cells was calculated to be 9 x 10-4 cm/sec (i.e., .0009 cm/sec, equivalent to 5.4 meters per week). At this rate, with the expected amount of rainfall, the SJRPP Environmental Impact Statement projects that about 500 gallons per day of leachate will enter surface waters. Of this amount, about 2 to 5 pounds of heavy metals--including arsenic, selenium, zinc, copper, lead, mercury, nickel, silver and antimony--will enter the surface water each year.

b. Soil Type--The physical properties of a soil also influence movement of leachate from a waste-storage site. As seen in Table VI-6, soils such as sands and sandy loams have a much greater probability of contamination than do clays. Also, the greater the rainfall, and the higher the acidity of the waste, the higher the possibility of contamination.

Another property of a soil that influences the transport of solutes is called the "cation exchange capacity" (CEC). Generally, the higher the CEC, the greater the soil's ability to adsorb cations from coal ash or FGD sludge leachates. For most soils, the higher the clay content and organic matter of soil, the greater its cation exchange capacity and, consequently, its ability to trap pollutants.

Table VI-6: Potential for Adverse Effects to Groundwater and the Terrestrial Food Chain from Seepage from Unlined Ash and Sludge Waste-Disposal Sites. Source: Dvorak (1978).

Factor	Relative probability of: Groundwater contamination	Relative probability of: Food chain contamination via soil
Nature of waste		
Dry	Low to moderate	Low to moderate
Slurry	High	High
Acid	High	High
Alkaline	Low to moderate	Low to moderate
Nature of substrata[a]		
Granite	Extremely low	Not applicable
Shale	Low	Not applicable
Sandstone	Moderate	Not applicable
Sand	High	Not applicable
Soil	High	High
Nature of soils		
Clays	Low	High
Loams	High	High
Sands, sandy loams	Very high	High to low
Rainfall zone[b]		
< 25 cm (< 10 inches)	Low	Low to high
25-76 cm (10-30 inches)	Low to high	High
> 76 cm (> 30 inches)	High	High, except for sandy areas

[a]Defined as the layer or layers of natural material beneath the waste, or between the waste impoundment and the groundwater aquifer.
[b]Annual average precipitation.

4. Impacts on Plant and Animal Life

Little can be said with certainty about the toxicity of leachate from coal ash and FGD sludge materials; however, it is known that pathological effects produced by exposure to the trace elements found in leachate from power plants can disrupt terrestrial and aquatic food webs when these toxic elements are introduced into wildlife populations. Consequently, these impacts should always be examined when siting a coal-fired plant.

Owing to the complex interaction among the kinds of animals, kinds of soils, amount of concentrations, amount of rain and so forth, these impacts are difficult to quantify with accuracy. Table VI-7 lists the known toxic effects of trace elements found in the leachate of power palnt waste and storage sites. For definitions of technical terms, see the Glossary, Attachment VI.

Note that even if minute quantities of trace elements are released into the soil, plants and animals can concentrate these pollutants into levels of concentration that can be potentially dangerous. This concentrating property of organisms in known variously as "bioaccumulation," "bio-concentration," and "biomagnification." All these terms describe an essential biological process, but one that can work to the organism's disadvantage if the substance concentrated is harmful. This effect is often found in organisms at or near the top of the food chain, such as large fish, fish-eating birds and man. (See Table VI-8.)

Bioaccumulation and biomagnification of trace elements depend on a number of factors, varying from species to species, and from one element to another. Table VI-8 lists concentrations of 29 trace elements in four types of living organisms: "benthos" (i.e, organisms that live in or near the bottoms of bodies of water), plants, invertebrates, and fish. (For further information, see the study by Dvorak et al. Tables VI-7 and VI-8 are from Dvorak et al. (1978). listed in the Bibliography, Section 6.)

Table VI-7: General Manifestations of Trace Elements in Animals. Source: Dvorak (1978).

Element	Target organs or characteristics of toxicity	Comments
Arsenic	Has been associated with increased incidence of lung cancer.	Non-accumulative in animals but has affinity for hair, nails, and skin.
Barium	Has strong stimulating effect on all muscles in acute poisoning.	Poorly absorbed with generally little retention in tissue.
Beryllium	Characteristic granulomatous changes of lung tissue is brought about by long-term exposure.	Via inhalation, beryllium is correlated with an interference in the passage of oxygen.
Cadmium	Is linked with the incidence of hypertension in experimental animals.	Accumulative in all animals and toxic to all systems and functions in humans and animals.
Cobalt	Causes changes in lungs typical of pneumoconiosis. Also causes induction of polycythemia in many species.	With increasing age, the body burden of cobalt diminishes.
Copper	Associated with induction of haemolytic disease, especially in certain species.	In excess, results in some accumulation in the tissue, especially in the liver.
Chromium	Hexavalent compounds extremely toxic to body tissue. Insoluble forms retained in lung tissue.	In particular, the respiratory tract and fat tissue accumulate this metal.
Fluoride	Contributes to dental fluorosis in animals.	Deposits in bone tissue.
Lead	Newly absorbed lead is mostly retained in the body as lead triphosphate, especially in liver, kidneys, pancreas, and aorta.	Has strong affinity to accumulate in bone tissue.
Manganese	Acute intoxication involves changes in the respiratory system, whereas chronic poisoning affects the central nervous system.	Most amounts taken into the body are retained, especially in liver and lymph nodes.
Mercury	Organic forms have effects on brain tissue. The inorganic form is more linked to damage to liver and kidneys.	Can bioaccumulate in tissues of animals.
Molybdenum	Associated with degenerative changes in liver cells.	Can accumulate in tissues.
Nickel	Associated with cancer of lungs.	Very poorly absorbed from gut.
Selenium	Associated with alkali disease in cattle.	Is converted in the body into a volatile compound which is eliminated through breath and sweat.
Vanadium	Is found to inhibit the synthesis of cholesterol and other lipids. Other complications leading to cardiovascular diseases are also prevalent.	Vanadium salts are poorly absorbed from the gastrointestinal tract.
Zinc	Intoxication produces either lung or intestinal tract manifestations.	Absorbed or injected zinc is incorporated at varying rates into different tissue, indicating varying rates of zinc turnover.

Table VI-8. Concentrations of Trace Elements in Abiotic and Biotic Compounds of an Ash Basin Receiving Stream. Note: "Abiotic" refers to water with no living organisms. Source: Dvorak (1978).

Trace element	Concentration (ppm)				
	Abiotic	Biotic			
	Water	Benthos	Plants	Invertebrates	Fish
Aluminum	13.0	40,657.0	3,985.1	1,199.3	215.5
Iron	16.9	20,912.4	1,113.2	1,202.6	154.7
Potassium	6.1	8,149.2	1,803.6	2,666.2	1,946.2
Calcium	9.2	1,844.8	850.1	2,656.4	5,752.9
Magnesium	4.1	5,460.8	656.2	369.4	307.2
Titanium	0.9	2,388.5	109.4	71.5	15.1
Sodium	7.7	688.0	267.9	703.8	309.8
Chlorine	3.8	84.1	198.2	364.9	131.4
Barium	0.7	294.2	36.3	50.2	20.0
Strontium	0.3	236.0	60.3	48.4	36.3
Manganese	0.07	46.2	70.2	21.5	10.0
Cerium	0.2	129.7	9.7	4.3	1.6
Tin	0.1	85.0	18.0	20.7	3.4
Rubidium	0.4	51.6	8.2	29.0	8.5
Vanadium	0.04	63.9	4.7	4.4	0.6
Chromium	0.2	38.4	5.7	9.7	2.8
Zinc	0.4	6.4	5.0	14.9	11.8
Arsenic	0.06	19.7	4.2	2.1	0.5
Lanthanum	< 0.01	20.3	1.4	1.4	0.1
Thorium	0.03	15.3	1.3	1.7	0.3
Bromine	0.1	1.2	3.0	10.1	2.9
Selenium	0.1	6.1	1.8	2.6	9.4
Cobalt	0.1	10.6	1.7	1.7	0.5
Iodine	0.1	4.6	1.3	3.4	0.4
Uranium	0.01	8.0	0.7	0.3	0.1
Cadmium	0.1	1.7	1.5	4.0	1.3
Cesium	< 0.01	3.9	0.6	0.7	0.5
Antimony	0.07	1.0	0.8	2.1	0.7
Mercury	0.03	0.8	0.5	0.5	0.2

[a]Adapted from Guthrie and Cherry (1976).

5. Techniques to Reduce Water Pollution

To reduce water pollution from a coal power plant, three major techniques can be employed: (1) storage areas can be constructed with berms to channel water runoff into settling ponds; (2) relatively impermeable liners can be placed underneath the storage areas; and (3) waste products can be sold or compacted.

a. Construction of Berms--To reduce coal pile leachate and runoff, dikes (or "berms") are constructed around the coal pile storage area. In addition, holding ponds to settle suspended solids before entering ground water reduce TSS (total suspended solids). How berms can reduce water runoff during rainstorms is shown in Fig. VI-4, a diagram of water flow at the coal storage areas of OUC's Stanton 1 plant. Note that in this example, all drainage water is first channeled into a sedimentation pond--and then drained into the St. Johns River.

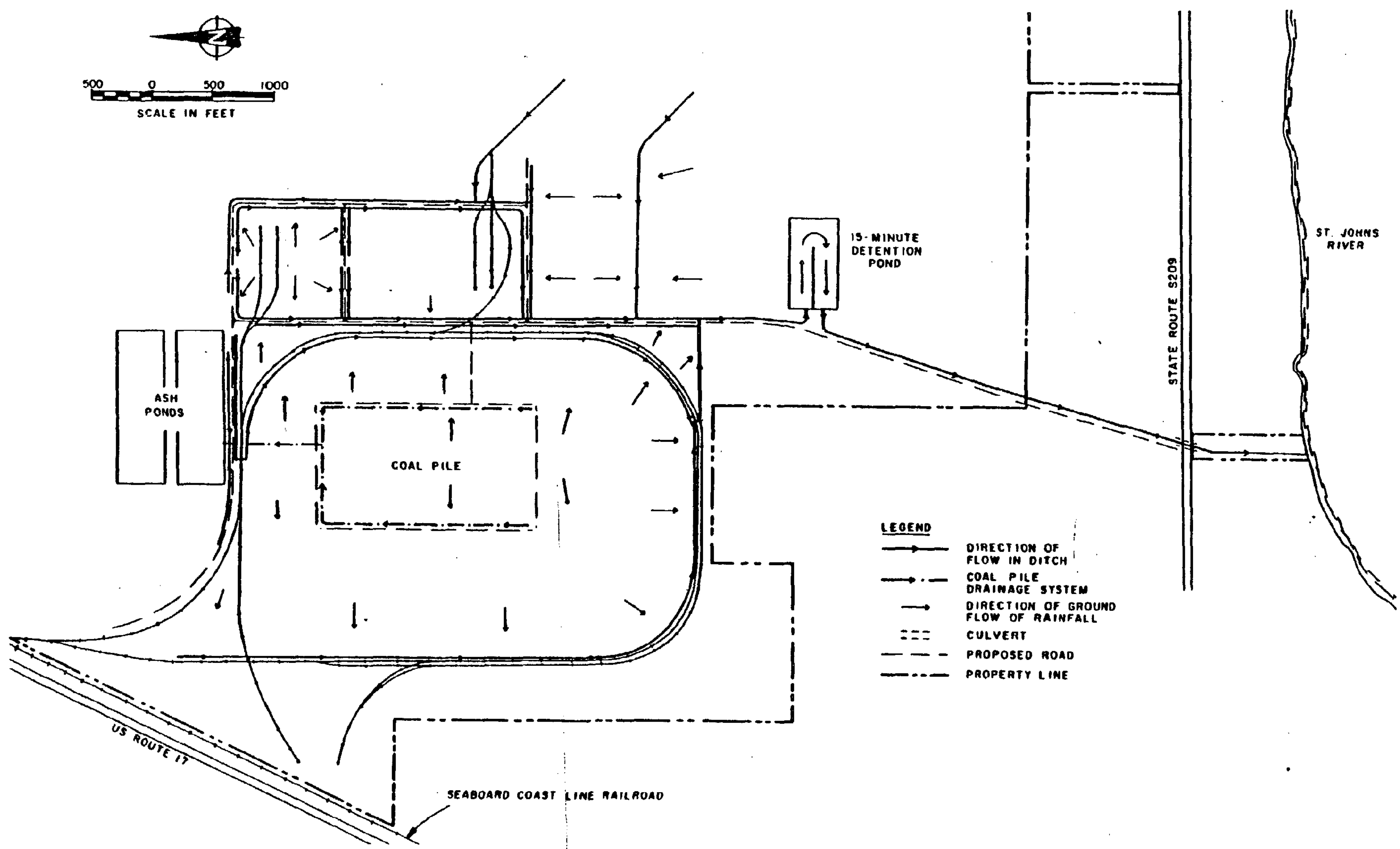
b. Impermeable Liners--To reduce leaching of contaminants into the soil, landfill sites at power plants are frequently lined with low permeability clay. This makes a relatively impervious barrier between the wastes and the "substrate" -- the ground below. As an alternative to clay, some power plants install an impervious polyethylene liner. It was estimated that at TECO's Big Bend 4, for example, where such a liner was not installed, that this type of liner would cost an additional $2.1 million. Recent research in Texas, however, has raised serious questions about the ability of these liners to retain their low permeability over a period of years.

With the use of a low-permeability clay liner at TECO's Big Bend 4 site, an estimated 250 gallons per minute of leachate will seep out of the bottom-ash pond into the "surficial aquifer" (i.e., ground water immediately below the surface). Leakage from the bottom-ash pond to the Floridan aquifer farther below is predicted to be 0.42 gallons per minute.

c. Compaction and Commercial Sales--To reduce leaching of pollutants, scrubber sludge can be mixed with coal ash. The natural cementing property of fly ash (called "pozzolanic" properties) binds the sludge, reducing leaching. This is beneficial for many utilities because sludge and ash can be stored in one simple process, making them more suitable for landfilling and taking up less land area. The permeability of compacted ash at OUC's Stanton plant, for example, was predicted to be 1 x 10-6 centimeters per sec (cm/sec), a fairly low permeability. Some compaction processes have been used to make concrete-like blocks, which can then be dumped offshore to form artificial reefs. (See Bibliography, below).

According to the industry, about 19 percent of fly ash is sold commercially, and many utilities, including TECO in Florida, sell flue-gas desulfurization byproducts (gypsum) commercially. See the Bibliography for further references on these programs.

Fig. VI-4. Storm Drainage System at the Coal Storage Pile, SECI Seminole 1.
Source: SECI's Seminole 1 PPSA (1978) Stanton 1 PPSA (1978).



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CHAPTER 7

OTHER IMPACTS

CHAPTER 7

OTHER IMPACTS OF POWER PLANTS

In earlier chapters, the impact of power plants on air and water quality have been examined. While local planners may have considerable interest in those subjects, their primary responsibility will be to assess questions such as socio-economic, noise, and transportation impacts. This chapter has been prepared to assist planners in considering these types of impacts.

A. SOCIO-ECONOMIC IMPACTS

Construction of a new coal-fired power plant, which could easily cost $1-2 billion, is obviously a major undertaking which can have a significant impact on a community. This is especially true in a rural area or a small town where construction and operation of a power plant can seriously burden social services such as schools, hospitals and roads. Even when the project is located near a large urban area, it will have an impact through the expenditure of millions of dollars in salaries and tax revenues.

Because of the large economic impact of power plants, each Power Plant Site Application (PPSA) contains a section forecasting the impact the plant will have on the community. To help planners evaluate the socio-economic impact projections made in PPSAs this section summarizes the impacts projected in three typical PPSAs and compares these projections with the actual impacts experienced.

1. Projected Socio-Economic Impact in Three Florida PPSAs

Summaries of the socio-economic impacts projected in the Power Plant Site Application (PPSAs) of three recently-sited power plants in Florida are presented below. Each of these three case studies was chosen for a different reason:

--The St. Johns River Power Park, consisting of two 600-MW units, located close to Jacksonville, typifies impacts projected for a large new power plant located adjacent to an urban area.

--FPC's Crystal River Units 4 and 5 PPSA was chosen as an example of socio-economic impacts resulting from the addition of two new large units in a rural area, 100 miles from a major urban center.

--SECI's Seminole plant was selected to typify socio-economic impacts resulting from construction of two large units near a small city (Palatka), within commuting distance of a major urban area (Jacksonville), 50 miles away.

Table VII-1 summarizes the socio-economic impacts projected by the applicant utility in the PPSA of each of these three case studies. It should be noted that since each of the projects was approximately the same size, no adjustment was made for the size (MW capacity) of the plant in this comparison.

In reading Table VII-1 planners should bear in mind the definition of "multiplier," which is a measure of the total impact that a project will have on an area. The "multiplier" is defined as "the inverse of 1 minus the marginal propensity to spend (c) times the fraction of of consumer sales which which become local income (h)." This can be expressed as:

$$M = \frac{1}{1 - (c \times h)}$$

The industrial multiplier used by the Florida Bureau of Economic Analysis in Florida is 2.616, slightly more than the aggregate multiplier for power plant projects of 2.4 found by Leistritz (see Bibliography). If the multiplier used in the PPSA is 2.5, this implies that a payroll of $1 million would have a total impact of $2.5 million on the community.

Table VII-1: Socio-Economic Impacts Projected in Three Representative Power Plant Site Certification Applications in Florida. Sources: JEA/FPL SJRPP PPSA (1981); FPC's CR4&5 PPSA (1978); SECI Seminole 1&2 PPSA (1978). Note: Annual Payroll Figures are in Millions of Dollars.

Power Plant (Utility) Gross MW	Peak Workforce Projected (Annual Payroll)	Operating Workforce Payroll	Multi-plier Used in PPSA	No. of In-Migrating Workers	Induced Pop. Growth	Peak Prop. Taxes (Mill $ /year)	Assumed County Tax Rate (Mills)
St. Johns River Pwr Prk (JEA/FPL) 1280 MW	2,316 ($60.2)	375	1.76	533	1300	*	N/A
Seminole Units 1 & 2 (SECI) 1300 MW	1,013 ($30)	140	2.5	250	751	$11.74	16.34
Crystal River Units 4 & 5 (FPC) 1390 MW	1,030 ($20)	132	N/A	N/A	N/A	$5.3	11.64

* JEA is a tax-exempt public authority, but makes "payments in lieu of taxes." One-half of the plant is owned by JEA, which was expected to pay property taxes reaching a maximum of $5.4 million per year in 1987 (in constant 1980 dollars), declining to $4.06 million in 1997 and $2.03 million in 2012 as the plant is depreciated.

a. St. Johns River Power Park -- The SJRPP is an example of a large power plant located near a major metropolitan area. The plant consists of two units, the first one to come on-line in 1987, and the second in 1988.

As seen in Fig. VII-1, the peak labor force for the power plant was estimated by the PPSA to total 2,316 workers. Of these workers, 77 percent were predicted in the PPSA to be hired from the local area, and 23 percent to move into the area ("relocators"). These workers were projected to generate 4,078 new jobs in the community, for a multiplier effect of 1.76. This influx of population is projected to result in 1,300 additional persons in the community, an increase in the projected 1985 population of Duval County by only 1.6 percent.

As seen in Table VII-2, the construction payroll was projected to total about $206.3 million over five years, with a peak payroll of about $60.2 million (in 1980 dollars). In 1986, when both units were expected to be in full operation, the workforce was projected to be 375 persons, with an annual payroll of $6.4 million. Of these workers, about 124 were forecast to move into the area.

Because JEA is a municipal utility, it is exempt from property taxes. However, it makes "payments in lieu of taxes." One-half of the plant is owned by Florida Power and Light, an investor-owned utility that is subject to taxes. See the footnote in Table VII-1 regarding projected tax revenues.

b. FPC's Crystal River Units 4 and 5 -- The socio-economic impacts resulting from constructing Crystal River units 4 and 5 typify the impacts expected from the addition of two large units to a power plant located in a small, rural county with a population of 65,500.

Fig. VII-1: Peak Population Influx Projected for JEA/FPL St. Johns River Power Park. Source: Appendix Q, Technical Reference Document, SJRPP EIS (1981).

County/Population Locus	1985 Projected Population (P_i)	Miles From Proposed Project Site (D_i)	Distribution Factor (DF_i)	Peak Construction Population Influx[1]	Percentage Increase Over Projected 1985 Population
Baker/MacClenny	16,800	39.0	0.009	12	>1.0
Clay/Orange Park	76,600	23.5	0.065	85	1.1
Duval/Jacksonville	680,000	15.0	0.844	1,097	1.6
Flagler/Bunnell	12,400	78.5	0.004	5	>1.0
Nassau/Fernandino Beach	42,700	31.0	0.029	38	>1.0
Putnam/Palatka	53,700	55.0	0.022	29	>1.0
St. Johns/St. Augustine	58,100	47.0	0.027	35	>1.0

[1] Total population influx during peak construction phase: 1,300

Table VII-2: Estimated Payroll Income for Construction and Operation of the St. Johns River Power Park. Source: Appendix Q, Technical Reference Documents, JEA/FPL SJRPP EIS.

Estimated payroll income generated by the construction of the SJRPP.

Year	Number of Jobs	Construction Payroll	Number of Secondary Jobs	Secondary Payroll
1982	254	6,604,000	447	4,570,575
1983	1,366	35,516,000	2,405	24,591,125
1984	2,316	60,216,000	4,352	44,499,200
1985	2,294	59,644,000	4,310	44,069,750
1986	1,089	28,314,000	2,046	20,920,350
1987	614	15,964,000	1,154	11,799,650
Total		206,258,000		150,450,640
Combined Total		356,708,640		

Payroll income generated by operation of the SJRPP.

Year	Number of Operation Jobs	Operation Payroll	Number of Non-Basic Secondary Jobs	Non-Basic Secondary Payroll
1982	-	-	-	-
1983	-	-	-	-
1984	68	$1,158,720	128	$1,308,800
1985	281	$4,788,240	528	$5,398,800
1986	281	$4,788,240	528	$5,208,625
1987	375	$6,390,000	705	$7,208,625
1988	375	$6,390,000	705	$7,208,625
2025	375	$6,390,000	705	$7,208,625
2026	281	$4,788,240	528	$5,398,800
2027	281	$4,788,240	528	$5,398,000
Total		$269,520,000		$326,912,000

FPC stated that an average of 750 construction workers would be employed for the two units, over seven years, with peak employment rising to 1,030 personnel during the fourth year. Based on the experience of the utility with construction of other units at Crystal River, FPC predicted that 25 percent of the construction workers would come from within a radius of 20 miles, 25 percent from within the next 20 miles, 25 percent from the next 20 mile-radius, and 25 percent from beyond this 60-mile radius.

For the two units, FPC projected that the construction labor cost would be about $20 million per year for seven years. When both units are on-line, the utility estimated a total direct employment of 132 additional persons, with an annual payroll of $3.4 million.

According to the applicant, social services, schools and housing of Citrus County would be adequate to absorb the influx of workers with little difficulty. Once the two units are completed, the PPSA predicted that they would generate about $5.3 million in net property taxes annually. These projections, of course, cannot be confirmed until construction is complete and the two units have been appraised by the county tax assessor.

c. SECI's Seminole Units 1 and 2 -- Construction of SECI's Seminole units 1 and 2 north of Palatka represents the type of impacts expected by a project located near a small city (Palatka), within commuting distance of a major metropolitan area (Jacksonville).

According to the SECI PPSA, it was assumed that 85 percent of the manual laborers would commute from the Jacksonville area, 50 miles away; 5 percent would relocate to the Palatka area; and 10 percent would be local residents. For supervisory personnel, the utility projected that 75 percent would commute from Jacksonville, 20 percent would relocate to Palatka, and 5 percent would be local residents.

As seen in Table VII-1, the total direct construction work-force was projected to reach a peak of 1,013. The total labor cost was estimated to rise to a maximum of about $30 million annually during the period of greatest employment, the third year. When the plant is operational, the utility estimated a total direct employment of 140 additional persons.

Using a multiplier of 2.5 and assuming that 5 percent of the manual laborers and 20% of the supervisory personnel would relocate to Palatka, SECI forecast that the project will generate a maximum population increase of about 751 new residents in Putnam County in the sixth year (see Table VII-3). This is an increase of 1.6% above baseline population projections.

Assuming 3 persons per household, SECI projected the need for about 250 additional housing units. But because there were 1,567 dwelling units available at the time of the study, the utility projected no adverse impacts on housing. An increase of 1.6 percent in the county's population was not considered a significant strain on the county's services such as police protection, medical care and education.

As seen in Table VII-4, SECI projected that property taxes for units 1 and 2 together, assuming a 100 percent assessment ratio and a total county tax of 16.326 mills would be $11.74 million in 1985, declining slowly thereafter as the plant is depreciated. An independent analysis of the accuracy of these projections is presented in Section 2, below.

2. Analysis of Socio-Economic Impacts

In conducting the PPSA review detailed in Chapter 2, local planners will wish to have reliable estimates of socio-economic impacts. To assist planners in reviewing the reliability of socio-economic impacts contained in PPSAs, this section presents the results of two studies which have compared projections made by utilities in site applications with actual impacts experienced in the community:

Table VII-3: Aggregate Projected Population Change due to Seminole Project, Putnam County, Florida. Source: SECI Seminole 1 and 2 PPSA (1978). Note that "Incremental Relocators" refers to the number of persons moving into (or out of) the county.

Year	Incremental Construction Phase Relocaters (A_t)	Incremental Operation Phase Relocaters (B_t)	Incremental Total Relocaters (C_t)	Incremental Total Relocaters Plus Family Members (Direct Population Increase (D_t)	Incremental Population Change Due to Seminole Project (Direct Plus Indirect Population Increase) (E_t)	Aggregate Population Change Due to Seminole Project (F_t)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1978	0	0	0	0	0	0
1979	5	0	5	15	38	38
1980	14	0	14	42	105	143
1981	24	0	24	72	180	323
1982	22	0	22	66	165	488
1983	-15	50	35	105	263	751
1984	-2	0	-2	-6	-15	736
1985	-32	20	-12	-36	-90	646
1986	-16	0	-16	-48	-120	526

Source: Burns and Roe, Inc., April 24, 1978; U. S. Dept. of Commerce, 1974, Statistical Abstract of the U. S., page xiii; U. S. Water Resources Council, January 1977, Guideline 5, Regional Multipliers, Washington, D.C.; Seminole Electric Cooperative, Inc., May 2, 1978; and Dames & Moore, June 1978.

Table VII-4: Projected Putnam County Property Taxes, Seminole Units 1 & 2. Note: Assumes no change in 1977 Putnam county tax rates in future years. Source: SECI's Seminole 1 & 2 PPSA.

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Unit 1 Non-exempt value[1]	368.0	355.7	343.5	331.2	318.9	306.7	294.4	282.1	269.9	257.6	245.3	233.1	220.8	208.5	196.3	184.0	171.7	159.5
Unit 2 Non-exempt value[2]	0	0	372.1	359.7	347.3	334.9	322.5	310.1	297.7	285.3	272.9	260.5	248.1	235.7	223.3	210.9	198.5	186.1
TOTAL, Plant and Equipment	368.0	355.7	715.6	690.9	666.2	641.6	616.9	592.2	567.6	542.9	518.2	493.6	468.9	444.2	419.6	394.9	370.2	345.6
Coal stockpile non-exempt value[3]	1.5	1.6	3.4	3.6	3.8	4.0	4.3	4.5	4.8	5.1	5.4	5.7	6.1	6.4	6.8	7.2	7.7	8.1
TOTAL, Assessed Value	369.5	357.3	719.0	694.5	670.0	645.6	621.2	596.7	572.4	548.0	523.6	499.3	475.0	450.6	426.4	402.1	377.9	353.7
Estimated Putnam County Ad Valorem Taxes @ 16.326 mils (1978)	6.03	5.83	11.74	11.34	10.94	10.54	10.14	9.74	9.35	8.95	8.55	8.15	7.75	7.36	6.96	6.56	6.17	5.79

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Unit 1 Non-exempt value[1]	147.2	134.9	122.7	110.4	98.1	85.9	73.6	61.3	49.1	36.8	24.5	12.3	0	0	0	
Unit 2 Non-exempt value[2]	173.7	161.3	148.9	136.4	124.0	111.6	99.2	86.8	74.4	62.0	49.6	37.2	24.8	12.4	0	
TOTAL, Plant and Equipment	320.9	296.2	271.6	246.8	222.1	197.5	172.8	148.1	123.5	98.8	74.1	49.5	24.8	12.4	0	
Coal stockpile non-exempt value[3]	8.6	9.1	9.7	10.3	10.9	11.5	12.2	13.0	13.8	14.6	15.5	16.4	8.7	9.2	0	
TOTAL, Assessed Value	329.5	305.3	281.3	257.1	233.0	209.0	185.0	161.1	137.3	113.4	89.6	65.9	33.5	21.6	0	
Estimated Putnam County Ad Valorem Taxes @ 16.326 mils (1978)	5.38	4.98	4.59	4.20	3.00	3.41	3.02	2.63	2.24	1.85	1.46	1.08	0.55	0.35	0	191.43

NOTES:

1 \$460 million less 20% for estimated value of tax exempt pollution control equipment. Depreciated straightline over 30 years. Assume unit is "substantially" completed for commercial use as of 1/1/83 (on line 6/1/83), and that assessment ratio on non-exempt property is 100%.

2 \$465.17 million less 20% for pollution control equipment. Depreciated straightline 30 years. Assume unit is substantially complete 1/1/85 (on line 6/1/85).

3 Coal stockpile of 75 days supply. On basis of 1.5 mtpy per unit, stockpile equals 308,219.2 tons. Use 310,000 ton/unit average. Value of coal based on 1978 cost of \$1.60 per million Btu, escalates to 1986 at 5.3% per year and 6.0% thereafter (per SECI letter dated 5/2/78). Assume coal average heat value of 12,000 Btu per pound. Thereafter, gross value of inventory =

310,000 tons x 2,000 lbs x 12,000 Btu/lb x \$1.60/million Btu = \$11,904,000 (1978) x $(1.053)^5$ = \$15,411,140 (1983)
= \$16,227,931 (1984)
(x 2) = \$34,176,022 (1985)
= \$35,987,351 (1986)
@ 6.0% ___ = \$38,146,592 (1987)

Assume assessment ratio of ~~10%~~ 100%

Source: SECI

--One study, conducted by John Gilmore and others at the University of Denver, and published by EPRI in 1982, compared the socio-economic impacts of twelve power plant construction projects as actually measured with the impacts projected prior to the project's start.

--A 1984 study by the Northeast Florida Regional Planning Council (NEFRPC) compared the socio-economic impacts projected by Seminole Electric Cooperative's PPSA for the Seminole plant with actual impacts experienced in Putnam County.

Both of these studies, as well as others cited in the Annotated Bibliography, can be consulted by local planners when reviewing a PPSA. If the reviewer feels that the socio-economic forecast is inaccurate, incomplete or otherwise insuffecent, he can request the applicant utility, either directly or through DER, to provide additional information. However, under Florida law, the applicant is not required to provide more information than is required in the PPSA Instructions (DER Form 17-1.2 11 C 1).

A recent study of the way socio-economic impacts are dealt with in power plant site certification applications conducted by the Northeast Florida Regional Planning Council has called for a substantial revision to DER's rules to require far more information from applicants. At the time this is written DER has not modified its application instructions to reflect these recommendations.

a. Gilmore Study--Gilmore found that the labor force needed for a project--and therefore the entire socio-economic impact of the project--was usually underestimated in the site application. Fig. VII-2 shows the labor force actually employed by three plants, compared with the predicted workforce.

In addition, the Gilmore study noted a number of socio-economic problems with power plant construction projects which planners should be aware of when reviewing a PPSA:

--In all but one case, the magnitude of construction employment differed substantially from the estimates made prior to commencement of the project.

--In many of the cases studied, delays occurred because of labor stoppages, regulatory delays, changes in the utility's load factor, and in material shortages.

--The presence and activity of labor unions have a major impact on the supply of labor, which will have a strong impact on the number of in-migrating workers. (This was also found in the NEFRPC study.)

--In nearly all cases, the geographic extent of the impact area was greater than had been estimated.

--The construction of a major new power plant frequently brings with it construction of new public facilities, such as schools, firehouses, and city halls.

--In many cases, there was a mismatch between the community receiving the financial benefits and the communities suffering adverse impacts.

--In all cases studied, the impact of additional traffic caused by plant construction was identified as a serious local impact.

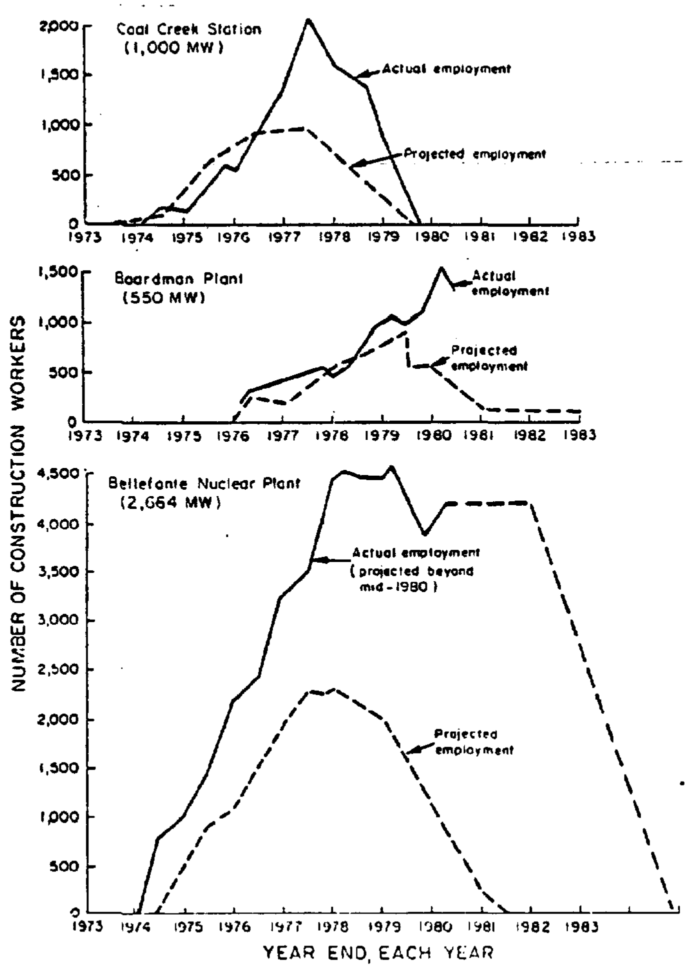
--Secondary employment effects caused by operating the plant were greater than anticipated.

--Housing impacts tended to be small, as workers preferred mobile homes, long-term rentals of motel rooms, or boarding houses.

--Concern over the socio-economic impact of power plants built adjacent to large urban areas can largely be ignored, but impacts in rural areas can be very important.

The Gilmore study compared the actual, measured impacts with those projected by 11 different models. Among the integrated models evaluated by the Gilmore study were the Argonne Model (SEAM), the Mountain West model (BREAM), the Los Alamos model (BOOM), the model used in the EPA Action Handbook, the DRI/RPA model (WEST), and the Arthur D. Little model (SIMPACT).

Fig. VII-2: Actual vs. Projected Construction Workforce, Three Power Plant Construction Projects. Source: Gilmore et al. (1982)



Source: Data obtained from utility or plant builder in each of the case studies noted.

b. <u>NEFRPC Study</u>--A study by the Northeast Florida Regional Planning Council published in 1984 compared the actual impacts of Seminole Electric Cooperative's Seminole plant in Putnam County with the PPSA submitted for the plant. As in the Gilmore study, the researchers found significant discrepancies between the projected impacts and the impacts which actually occurred. The NEFRPC study found that;

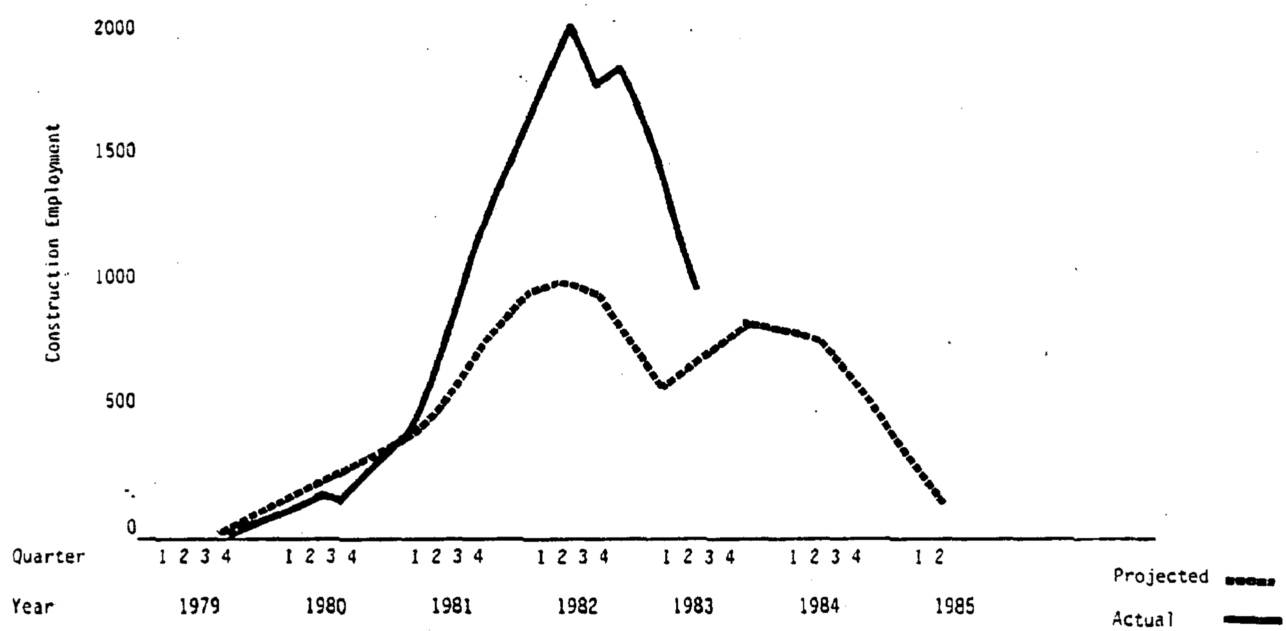
--the peak workforce was double the amount projected in the PPSA, causing far greater socio-economic impacts than had been forecast. These figures are graphed in Fig. VII-3. The problem of utilities frequently underestimating the socio-economic impacts of a proposed power plant was also found the Gilmore study.

--Whereas the PPSA projected that 40 percent of the county's assessed valuation would be represented by the power plant, in actuality it became only 30 percent. One reason for this was that with the addition of the plant to the tax rolls, the county's tax rate was lowered. This action was not anticipated in the PPSA.

--The PPSA for Seminole Units 1 and 2 projected that 5 per cent of the workforce would relocate to the county. In actuality, 28 percent relocated, thus causing a much greater socio-economic impact than had been projected.

--The power plant construction workforce came from a considerably wider geographical region than had been forecast in the PPSA, thereby distributing the impacts throughout the region.

Fig. VII-3: Projected vs. Actual Workforce, SECI's Seminole Units 1 and 2. Source: NEFRPC (1984).



Source: Seminole Electric Company, 1984
Northeast Florida Regional Planning Council

3. Annotated Bibliography

Berkshire County Regional Planning Commission. Evaluation of Power Facilities: A Reviewer's Handbook. (Pittsfield, MA: Berkshire County RPC, April, 1974). Available ILL: FSU Call Nr. DOC HD 9685 U5.

This handbook goes into great depth describing the socio-economic impact of a transient labor force. While much of this information is narrative and descriptive, rather than quantified, it a valuable reference.

Clemente, F. et al. Public Reaction to Proposed Energy Facilities: A Sociological Analysis. (Pennsylvania State Univ., Center for Study of the Environmental Policy, 1978).

Curry, Martha. State and Local Planning Procedures Dealing with Social and Economic Impacts from Nuclear Power Plants. (Washington, D. C.: U. S. Nuclear Regulatory Commission, January, 1977).

Fishkind, Henry et al. The Fiscal Impact Model. (Gainesville, FL: The Univ. of Florida Bureau of Economic and Business Research, June, 1983).

Dr. Henry Fishkind and others at the Bureau of Economic and Business Research of the Univ. of Florida have prepared a fiscal impact model validated in Florida. This project, coordinated by the Bureau of Land and Water Management of the Florida Deptment of Community Affairs and funded by the STAR grant program of the Board of Regents, provides projections regarding home sales, social services, tax revenues, commercial development, transportation impact and other variables. It may be run on a desk-top microcomputer. For more information on this model, contact Dale Eaker, Florida Bureau of Land and Water Management, Tallahassee, FL (904/488-4925).

Gilmore, J. S. Socioeconomic Impacts of Power Plants. (Palo Alto, CA: EPRI, 1982). EPRI Rpt. 2228.

See text.

Leistritz, Larry. Economic, Demographic, and Social Factors Affecting Energy-Impacted Communities: An Assessment Model and Implications for Nuclear Energy Centers. (North Dakota State Univ., 1977).

Maryland Power Plant Siting Program. RIFLE: Regional Impact on Facility Locations on the Economy. (Annapolis, MD: Maryland Power Plant Siting Program, February, 1983). 2 vols.

One of the most intensive efforts to project socio-economic impacts has been undertaken by the state of Maryland, which has produced the RIFLE program. This model is particularly valuable in projecting impacts on social services, such as health care, education, police protection and water supply. For information on running the Maryland model, call the Maryland Power Plant Siting Program office (301) 269-2269.

Myhra, David. Energy Plant Sites: Community Planning. (Atlanta, GA: Conway Publishers, 1980).

To assist communities with overcoming the adverse effects of "boomtown" development, David Myhra has written this guide to community planning that should be useful to planners dealing with power plant siting.

North Central Florida Regional Planning Council. Economic, Fiscal, and Land Use Analysis, Seminole Electric Coal-Fired Electric Generating Plant, Taylor County, Florida. (Gainesville, FL: NCFRPC, in preparation).

This study examines the potential socio-economic impacts resulting from possible construction of two coal-fired power plants near Perry (SECI's proposed Taylor units 1 and 2). At the time this handbook goes to press, this study has not been published. For further information, contact the regional planning council.

Northeast Florida Regional Planning Council. An Analysis of the Socio-Economic Impacts of the Seminole Electric Cooperative Power Plant, Putnam County, Florida. (Jacksonville, FL: NEFRPC, 1984).

This study, like the NCFRPC study, was funded by the Coastal Energy Impact Program. See text for main conclusions of this study.

Strain, J. Robert. Community Economic Growth: Impact Model. (Gainesville, FL: Institute of Food and Agricultural Sciences, 1982.) Circular # 513.

Dr. Robert Strain at IFAS (the Institute for Food and Agricultural Sciences of the Univ. of Florida) has developed a socio-economic impact model specifically tailored to impacts in Florida. For further information, contact Dr. Strain at the Univ. of Florida, Gainesville, FL 32606 (tel. 904/392-1718).

Stacey, Gary and Duchi, Mary. A Method for the Analysis of Socioeconomic Impacts of Large Energy Projects and Facilities. (Columbus, OH: Battelle Laboratories, March, 1980).

Gary Stache and Mary Duc-hi of Battelle Laboratories, Columbus, OH, have developed a model that has been used to project the socio-economic impact of power plant construction. For further information on using this model, the researchers may be contacted at (614) 424-6494.

B. NOISE IMPACTS

Whenever a power plant is proposed, one of the concerns certain to arise is the question of noise. Although there are no state noise standards for stationary sources such as power plants, all Florida Power Plant Site Applications (PPSAs) provide data on the projected noise level of the proposed plant, and this is an appropriate area for review by local planners.

To enable planners to better interpret these noise level projections appearing in PPSAs, this section indicates how sound levels are measured, reviews comparative noise levels, and examines the projected noise levels predicted for two coal-fired power plant projects in Florida.

1. Noise Measurement and Regulations

Noise can be described either by spectrum component or overall energy levels. The more complete description is by spectrum components, in which sound energy is quantified at different frequencies. This is an important method of characterizing sound since the human ear has a sensitivity which varies markedly with frequency. Typically, a spectrum description uses nine separate octave bands. The sound energy is measured in decibels (dB) on a logarthymic scale; i.e., decibels are increased arithmetically, sound intensity is increased geometrically.

The individual octave bands of the sound spectrum are weighted according to the frequency sensitivity of the human ear. An overall sound level, described as the "A-weighted sound pressure level," reported in units of dBA, can be obtained. Table VII-5 lists several common sources of noise in terms of their overall dBA levels. The following units of measurement are normally used:

Table VII-5: Typical A-Weighted Sound Levels Measured with a Sound-Level Meter. Source: Maryland PPCEIP (1982).

	DECIBELS	
	140	
50 HP Siren (100')		
	130	
Jet Takeoff (200')		
	120	
Riveting machine	110	
	100	
Textile Weaving Plant Subway Train (20')		
	90	Boiler Room
Pneumatic Drill (50')		
	80	Inside Sport Car (50 MPH)
Freight Train (100') Vacuum Cleaner (10') Speech (1')	70	
		Near Freeway (Auto Traffic)
	60	Large Store
Large Transformer (200')		Private Business Office
	50	
		Average Residence
	40	Nightime Residential areas
Soft whisper (5')		
	30	
	20	
	10	
Threshold Of Hearing	0	

Note: These values are taken from the literature. Sound-level measurements give only part of the information usually necessary to handle noise problems, and are often supplemented by analysis of the noise spectra.

Leq (Equivalent Sound Level)--is the A-weighted sound pressure level averaged over a 24-hour period.

Ldn (Day/Night Sound Level)--is the dBA sound level averaged over a 24-hour period, but where the hours from 10 PM to 7 AM are treated as if they were 10 dB greater than the actual level. Thus L10 would be the dBA level exceeded 10 percent of the time, and the L50 would be the level exceeded 50% of the time.

Table VII-6 provides design noise levels in five different land uses as used by the Environmental Protection Agency. Note that the interior of a home, hospital, library or motel is designed for an L10 of 55 dBA; outdoors these structures should not exceed an L10 of 70 dBA. In these structures, the Environmental Protection Agency uses a level of 45 dBA as a level at which there is an "Activity Interference."

2. Power Plant Noise Levels

Construction noise levels can be deafening at close range. At a distance of 50 feet, a large construction crane can register a level of 88 dBA, an air compressor 81 dBA, a concrete mixer 85 dBA, and a pile driver 101 dBA.

Fig. VII-4 shows the level of construction noise (Leq) predicted for the St. Johns River Power Park (SJRPP) at a distance of one mile. In this project, the Leq at a distance of one mile was projected to reach 57 dBA at times, exceeding the EPA residential standard of 55 dBA. TECO states that at a distance of 900 feet from construction of the Big Bend 4 plant, noise levels averaged 55 dBA and occasionally rose to 64 dBA.

Power plant operation is likewise noisy at close range. As seen in Table VII-7, according to the SJRPP EIS, at a distance of 50 feet, cooling tower noise is estimated to be 76 dBA, the turbine-generator 95 dBA, and the stacker-reclaimer (i.e., the coal loader), 75 dBA. These noise levels can be compared with the level of 70 dBA set by EPA to avoid damage to hearing.

Table VII-6: Summary of Maximum Noise Limits Identified by EPA as Requisite to Protect Public Health with an Adequate Margin of Safety. Source: CSPC (1980).

Effect Protected Against	Recommended (Maximum) Noise Level	Area
Hearing Loss	Level Equivalent 24 hrs. 70 decibels	All Areas
Outdoor Activity Interference & Annoyance	55 decibels	Outdoor areas, residential areas, farms, schoolyards, playgrounds
Indoor Activity Interference & Annoyance	45 decibels	Indoor areas, schools, churches, etc.

C. Occupational Health

Occupational Injuries for pipeline construction and operation from 1985 to 2035 were predicted using methodo-

Fig. VII-4: Projected Construction Noise Levels by Construction Period at a Distance of One Mile from the JEA/FPL St. Johns River Power Park. Source: Appendix T, Technical Reference Documents, SJRPP EIS (1981).

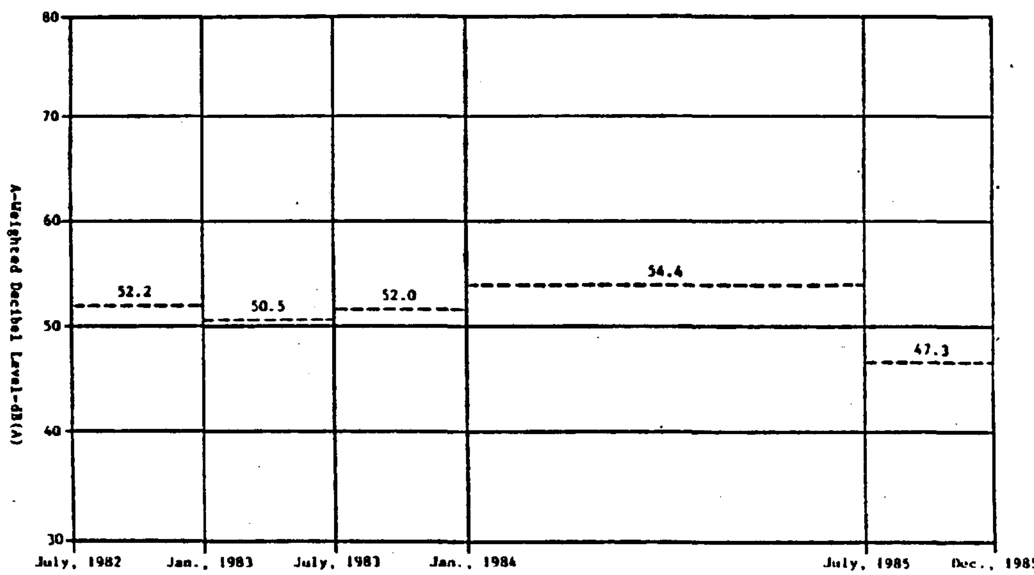


Table VII-7: Projected Operational Noise Levels at the Nearest Residence, St. Johns River Power Park. Source: Appendix T, Technical Support Documents, JEA/FPL SJRPP EIS (1981).

Component	Level dB(A)[a]	@ Feet	Total Number of Units	Distance to Nearest Residence[b] (feet)	Attenuated Level at Nearest Residence (dBA)
Cooling Tower	76	50	2	3700	38
Forced Draft Fan	85	5	4	5200	31
Induced Draft Fan	85	5	8	5400	34
Primary Air Fan	85	5	4	5200	31
Turbine-Generator	95	5	2	5200	38
Main Transformer	85	5	4	4300	31
Aux. Transformer	85	5	4	4300	31
Rotary Coal Car Dumper	73	50	1	5700	32
Stacker-Reclaimer	75	50	1	6000	33

Total plant noise level projected to nearest residence = 44 dB(A)

a Per Ebasco specifications and vendor information
b Monitoring Station 3, Figure 4.6-2.

At a distance of 3700 feet, however, the noise from the cooling tower was predicted to reach a level of only 38 dBA. At a distance of one mile, the turbine generator was predicted to register 38 dBA--a level lower than that of traffic on a major highway or road. If the background noise level is greater than the noise from the power plant, the plant's sound will be effectively masked; since the projected average level from the plant was 44 dBA, less than existing noise levels, the noise impact from the plant was not considered significant.

Table VII-8 shows the maximum sound levels predicted by TECO for operation of the Big Bend 4 plant, both by itself, and in conjunction with units 1-3. Note that with all four units in operation, at a distance of 4000 feet the noise level from the plant was predicted to be 60 dBA, significantly above the 45 dBA maximum recommended by EPA to avoid "activity interference" in a residential area. But at a distance of 8000 feet (the location of the closest occupied structure), the noise level was predicted to decrease to 45 dBA, the same level as the daytime level on the major highway.

Table VII-8: Maximum Sound Levels Predicted by Operation of TECO's Big Bend 4 Power Plant. Source: TECO BB4 EIS (1981).

Ambient-sound-level-monitoring locations[c,d]	Ambient residual sound levels[c] Day	Night	Units 1, 2, 3 (combined) continuous sound level	Unit 4 continuous sound level	Units 1, 2, 3, 4 (combined) continuous sound level	Units 1, 2, 3, 4 (combined) intermittent sound level Day	Night
Location 4 7500 ft NE at Adamsville	46	43	36	39	41	46	46
Location 5 3800 ft ESE at Big Bend Road	53	52	45	46	49	56	55
Location 6 4000 ft S at Newman Branch Road	43	44	44	45	48	60	54
Location 7 8000 ft SSW at Apollo Beach Road	43	37	35	36	39	47	45
Location 8 8000 ft SW at Apollo Beach Motel	45	42	35	36	39	45	45

[a]Adapted from TECO (1979).
[b]dBA referenced to 0.0002 microbar.
[c]Average of values obtained during survey of January 16, 17, and 18, 1978.
[d]The monitoring network is depicted in Figure 3-3.

C. TRANSPORTATION IMPACTS

Transportation impacts resulting from construction of a new coal-fired power plant can be categorized into two broad areas: (1) impacts of coal transportation and delivery by means of rail, barge or pipeline; and (2) impacts from increased truck and automobile traffic at the power plant site. This section examines each of these impacts.

In a Power Plant Site Application (PPSA), the applicant utility generally projects the impact from increased traffic, but normally omits the impacts resulting from the transportation of coal. Nevertheless, the impacts of coal transportation can be significant and worthy of consideration by planners.

A handbook on power plant siting, however, cannot deal in depth with transportation impacts. Much of the information presented in this section is based on the 1980 report of the Florida Coal Slurry Pipeline Study Committee, a study by SAI Inc. on coal transportation conducted for the Florida Statewide Coal Conversion Study, and the report on transportation impacts appearing in the University of Florida study The Impact of Increased Coal Use in Florida (1980). Planners dealing with this subject are encouraged to consult these and other references cited in the Bibliography, Section 4.

1. <u>Future Levels of Coal Deliveries</u>

As was discussed in Chapter 1, Florida had 6280 MW of coal-fired capacity on-line, and as a result of the units presently under construction, by 1992 coal capacity in projected to double. As seen in Fig. I-13, in 1980 8.8 million tons of coal were burned in Florida power plants. The <u>Ten-Year Plan</u> of the Florida Electric Coordinating Group projects that by 1985 coal consumption will to increase to 17.7 million tons, to 25.4 million tons in 1990, and to 27.6 million tons in 1992, more than three times the 1980 amount. (See Table VII-9.)

By the turn of the century, utility projections forecast a need for about 26,500 MW of coal capacity, 322 percent more than the 1983 amount. An increase in coal capacity of this magnitude would mean a dramatic increase in the tonnage of coal shipped into the state. Projecting the amount of coal that will be burned in Florida in years after 1990 is highly speculative, but estimates can be made using standard assumptions such as the capacity factor of new plants, the type of coal to burned, and the number of plants in operation. Coal plants in Florida burn coal at an average rate of 2.93 tons per gross megawatt. If this rate were to continue into the future, and if there were to be 26,500 MW of coal-fired capacity in Florida by 2001, coal consumption in Florida could rise to 77.6 million tons in 2001, almost nine times more than in 1980. (See Fig. VII-5)

This increase in coal deliveries could have a profound effect on the state's rail network and ports. With the upsurge in coal consumption, construction of a coal slurry pipeline to link coal fields of Appalachia with markets in Georgia and Florida has been proposed.

Table VII-10 shows the likely source of coal supply for six coal-fired power plants in Florida under construction or proposed to come on-line during the 1980s. Coal transportation by barge is being considered for five of these plants (TECO's Big Bend 4, FPC's Crystal River 4 and 5, the JEA/FPL St. Johns River Power Park, and SECI's proposed Taylor units 1 and 2). Coal delivery by rail is being considered for two plants: the St. Johns River Power Park and OUC's Stanton 1. Table VI-11 shows potential means of coal transportation to existing oil-fired power plants that could be converted to coal, as projected by the DOE/SAI study in 1983.

Table VII-9: Projected 1990 Coal Demands for All Coal-Fired Power Plants in Florida. Source: SAI/DOE (1983).

Utility and Generating Station	Units	Average Plant Capacity Factor†[1]	Projected 1990 Coal Demand†[1] (10^3 tons)
Florida Power Corporation			
Anclote	1,2	0.605	1,488
Bartow	2,3	0.501	551
Crystal River	1,2,4,5	0.402	2,940
Florida Power & Light Company			
Canaveral	1,2	0.695	1,743
Ft. Myers	2	0.320	410
Manatee	1,2	0.490	2,116
Martin	1,2	0.250	1,083
Port Everglades	3,4	0.655	1,654
Sanford	4,5	0.675	1,691
Turkey Point	1,2	0.600	1,517
Florida Power & Light Company; Jacksonville Electric Authority			
St. Johns River	1,2	0.680	2,566
Gainesville Regional Utilities			
Deerhaven	1,2	0.490	555
Gulf Power Company			
Crist	4-7	Not available	2,000
Scholz	1,2	Not available	230
Smith	1,2	Not available	1,000
Jacksonville Electric Authority			
Northside	1-3	0.590	1,391
City of Lakeland; Orlando Utilities Commission			
McIntosh	1-3	0.287	472
Orlando Utilities Commission			
Indian River	2,3	0.275	293
Orlando Utilities Commission; Florida Municipal Power Agency; City of Lakeland			
Stanton	1	0.490	720
Seminole Electric Cooperative			
Seminole	1,2	0.675	2,896
Taylor	1,2	0.700	2,987
City of Tallahassee			
Hopkins	1,2	0.575	409
Tampa Electric Company			
Big Bend	1-4	0.668	3,542
Gannon	1-6	0.382	1,596
TOTAL			35,850

†[1] Estimates obtained from dispatch analysis conducted by Science Applications, Inc., for U.S. Department of Energy, Fuels Conversion Division--except Crist, Scholz, and Smith estimates provided by the utility.

Fig. VII-5: Coal Consumption by Electric Power Plants in Florida, 1960-2001. Sources: PSC (1960-1981); PPSAs (1982-1991); figure for 2001 extrapolated from PSC GWH projection of 137,500 GWH from coal in that year.

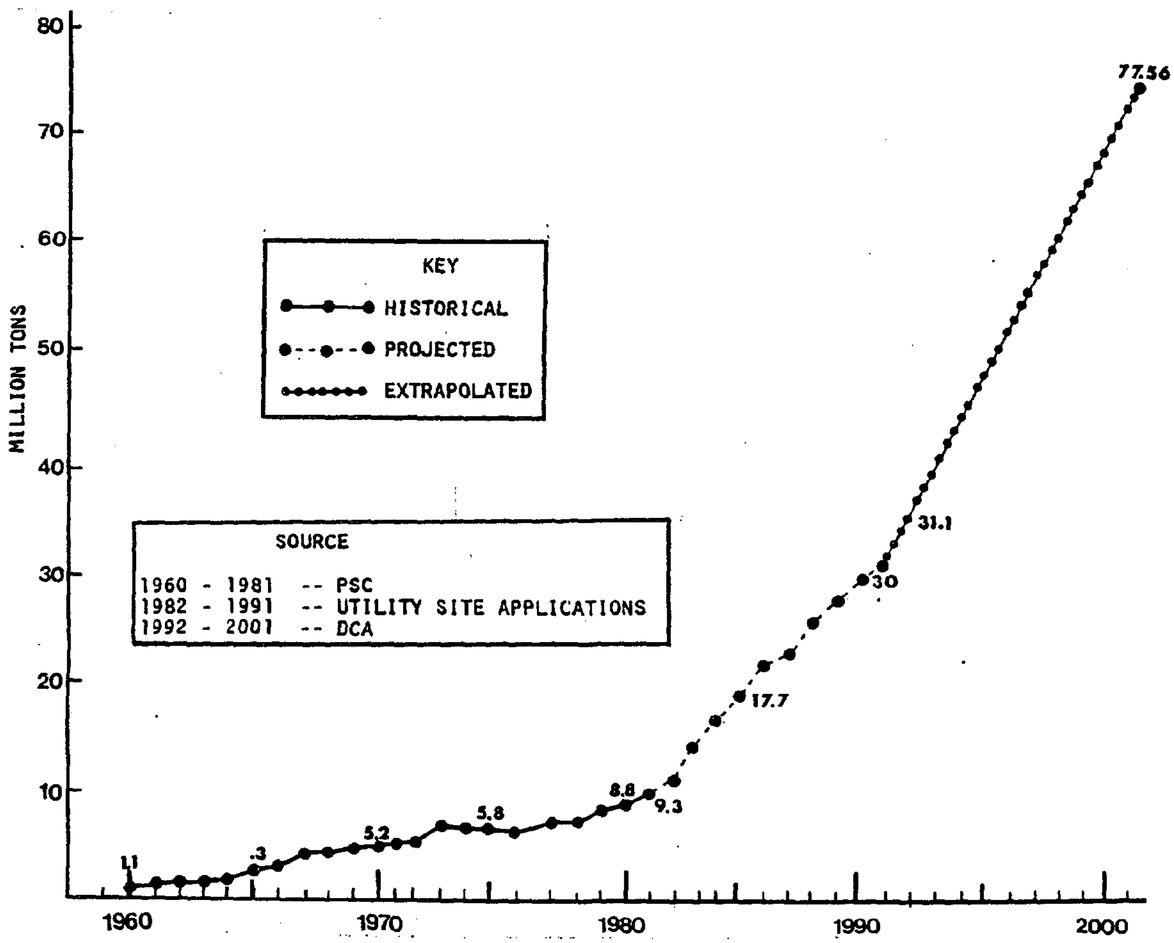


Table VI-10: Transportation Options and Potential Coal Supply Regions Being Considered for Six Coal-Fired Power Plants Under Construction or Proposed for Certification in Florida. Source: DOE/SAI (1983).

Generating Station	Unit	Date On-Line	Potential Supply Region	Transportation Options†[1]
Big Bend	4	3/85	S. IL	• River barge down Mississippi to ocean barges at Davant (New Orleans) to plant.
Crystal River	4 5	12/82 12/84	WV (33%)	• Rail to river barge down Ohio and Mississippi rivers to ocean barges at New Orleans to plant.
			VA (33%)	• Rail (SOU) to Mobile to ocean barges to plant.
			WY (33%)	• Rail to river barge on Mississippi River at St. Louis or Metropolis, to ocean barges at New Orleans to plant.
St. Johns River	1 2	12/85 6/87	Appalachia; AL; IL	• Rail (SCL) directly from mine. • Ocean transport to Port of Jacksonville.
Seminole	1 2	6/83 1/85	W. KY S. OH	• River barge down Ohio and Mississippi rivers, through Gulf Intra-coastal Waterway to Port of St. Joe, transfer to rail (SCL) to plant.
Stanton	1	11/86	Not available	• Rail (SCL) directly from mine.
Taylor	1 2	6/88 1/90	W. KY S. OH	• River barge down Ohio and Mississippi rivers, through Gulf Intra-coastal to Port St. Joe, transfer to rail (SOU or SCL) to plant.

†[1] Rail lines making final delivery: SCL - Seaboard Coast Line, SOU - Southern Railway.

Source: Information provided by the utilities.

Table VII-11: Transportation Options and Potential Supply Regions Being Considered for Conversion of Oil-Fired Power Plants in Florida. Source: DOE/SAI (1983).

Generating Station	Unit	Potential Coal Supply Region	Transportation Options†[1]
Anclote	1,2	Not available	• Florida Power Corp. believes that conversion is not economically feasible; may consider a coal/oil mixture delivered by pipeline. • No existing barge-receiving facilities. • Rail spur (SCL) within 1.5 miles; travels through residential area.
Bartow	2	Close to river system (preferably Mississippi River)	• Ocean barge (13,500-ton) directly to plant. • Rail to seaboard termination point (e.g., Pinellas Park rail siding); transfer to barge or truck to plant.
Canaveral	1,2	E. KY N. WV	• Rail (FEC) through Jacksonville. • Ocean transport from Atlantic Coast port to Port of Canaveral; transfer to barge on Atlantic Intracoastal Waterway to plant.
Deerhaven	1	WV; E. KY; VA	• Rail (SCL) directly from mine. • Coal-slurry pipeline.
Ft. Myers	2	E. KY N. WV	• Barge from Port Tampa/Manatee area to plant.
Hopkins	1,2	Not available	• Rail (SCL) directly from mine.
Indian River	2,3	Appalachia; IL	• Rail (FEC) directly from mine. • Ocean transport from Atlantic coast port to Port of Canaveral; transfer to barge on Atlantic Intracoastal Waterway to plant.
McIntosh	1,2	E. KY	• Rail (SCL) directly from mine.
Manatee	1,2	E. KY N. WV	• Rail (SCL) directly from mines.
Martin	1,2	E. KY N. WV	• Rail (FEC or SCL) directly from mines. • Ocean transport from Atlantic Coast port to Port of Canaveral; transfer to rail (FEC) to plant.
Northside	1-3	Appalachia; AL; IL; W. KY	• Rail (SCL) directly from mine. • Ocean transport to Port of Jacksonville.
Port Everglades	3,4	E. KY N. WV	• Rail (FEC) directly from mines. • Ocean transport from Atlantic coast port to Port of Canaveral; transfer to rail (FEC) to plant. • Ocean transport from Atlantic coast port directly to Port Everglades.
Sanford	4,5	E. KY N. WV	• Rail (SCL) directly from mines. • Ocean transport from Atlantic coast port to Port of Jacksonville; transfer to river barge to plant.
Turkey Point	1,2	E. KY N. WV	• Rail (FEC) directly from mines. • Ocean transport from Atlantic coast port (or possibly Gulf coast port) to either Port of Canaveral or Port Everglades; transfer to rail (FEC) to plant. • Ocean transport from Atlantic coast port (or possibly Gulf coast port) to either Port of Canaveral or Port Everglades; transfer to barge on Atlantic Intracoastal Waterway to plant.

†[1] Rail lines making final delivery: FEC - Florida East Coast; SCL - Seaboard Coast Line.

Source: Information provided by the utilities.

1. <u>Impacts from Coal Transportation by Rail</u>

Coal is normally delivered to a power plant by rail using a long "unit train" consisting of 70-100 hopper cars of 100 tons each. The cars are designed to be unloaded in a rapid fashion, with an average unloading time of about 30 seconds each. The train is typically pulled by six 3,600 horsepower locomotives at an average speed of 15 to 50 miles per hour. Unloading of the entire unit train may be as fast as 30 minutes.

In 1979 there were 214 unit train deliveries to two Florida utilities: Tampa Electric Co. and Florida Power Corp. This represented an average of 4.1 unit trains per week in the state.

As a rule of thumb, a 600 MW power plant operating at a 68 percent capacity factor requires about 30,000 tons of coal per week. This means that the plant will receive an average of about three unit trains per week, if each train has 100 cars, and each car carries 100 tons of coal. Based on these averages, the U. S. Office of Technology Assessment estimates that if 25 million tons of coal per year were delivered to Florida by rail, approximately sixty 80-car unit trains per week would be required. This is the amount that would be required if the state had the equivalent of 16 600-MW coal-fired plants.*

As shown in Chapter I, the Florida electric utility industry forecasts a quintupling of coal consumption in Florida by the end of the century. If rail transportation is used for coal delivery, impacts would include: increased noise levels along railway lines; increased traffic delays at grade crossings; and an increase in personal injuries due to rail transportation. Fig. VII-6 provides a map of the rail transpor-tation network in Florida, showing where these impacts would be experienced.

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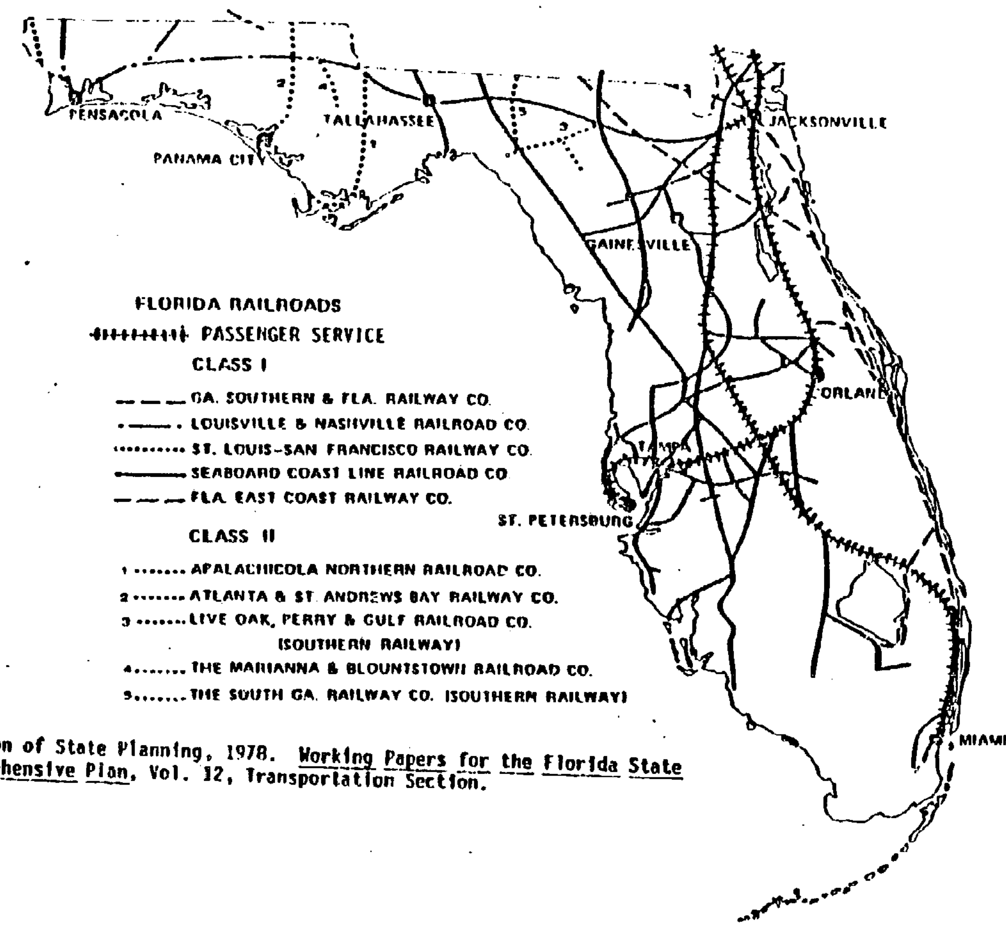
*See Chapter 1 for details on coal projections. The Florida electric utility industry predicts that 25 million tons will be reached in 1990. However, only a portion of all coal is shipped by rail.

Fig. VII-6. The Florida Rail Network. Source: Coal Slurry Pipeline Study Committee (1980).



Source: Division of State Planning, 1978. Working Papers for the Florida State Comprehensive Plan, Vol. 12, Transportation Section.

a. Noise Impacts -- Noise impacts from trains depend on train speed, the number and type of locomotives, train weight, topographical grade and type of track. The maximum sound level registered at a distance of 50 feet is between 80 and 100 dBA, far in excess of the 55 dBA set by EPA as the maximum standard for residential areas. Except for rail spur lines built specifically to deliver coal to power plants, these impacts will occur along existing railways where they already occur, although they will occur more frequently.

In its assessment of the coal slurry pipeline, the Office of Technology Assessment (OTA) has projected that if 25 million tons of coal were shipped to Florida by rail, there would be 29 "coal operations" per day on Florida rail lines. This, says OTA, would expose an additional 7000 persons to sounds above the 55 dBA standard on the Waycross (Georgia) to Ft. Lauderdale route, and an additional 4000 persons on the Waycross to Tampa route. The time of each "exposure" would be about one to three minutes.

b. Traffic Delays -- The Seabord Coastline Railroad has calculated that if 25 million tons of coal were brought into Florida by rail, traffic delays at grade-level crossings would be experienced at a number of locations. As show below, many of these impacts would be far removed from the location of the power plant:

Location	Additional Minutes Crossing Closed Per Day
Live Oak	30
Williston	24
Dade City	24
Paradise	24
Green Cove Springs	12
DeFuniak Springs	15

c. Personal Injuries -- As coal shipments increase rail traffic, the probability of car-train collisions with injury and death to both railroad workers and automobile passengers would increase. Table VII-12 shows the number of increased injuries and deaths projected by OTA in the event that 25 million tons of coal is shipped to Florida by rail yearly. OTA predicts that with this level of coal shipments, the annual number of deaths from rail transportation in Florida would increase from 11.4 to 13.5, an average of 2.1 more deaths per year attributable to coal transportation by rail.

In considering these impacts, however, planners should compare anticipated deaths from other transportation alternatives, such as coal shipment by barge, shipment of oil, use of a coal slurry pipeline, and so forth.

d. Air Pollution -- If 25 million tons of coal were shipped to Florida by rail annually, air emissions from diesel locomotives would increase. The Coal Slurry Pipeline Study Committee report estimated that this increase would be approximately 6,900 tons per year (TPY) of NOx, 90 TPY of SO2 and 1,250 TPY of hydrocarbons. In addition, about 0.1 to 1% of the total coal tonnage shipped would become fugitive dust. These figures can be compared with the projected output of TECO's Big Bend unit 4, which is expected to generate 8,760 TPY of NOx and 18,396 TPY of SO2 operating at 75 percent capacity.

2. Impacts of A Coal Slurry Pipeline

As indicated in Chapter 1, there have been proposals to construct a coal slurry pipeline (CSP) to connect the coal fields of Appalachia to the coal-fired power plants of Georgia and Florida. Operation of a coal slurry pipeline would be expected to include bring about impacts on water quality, land use and air quality, in addition to construction impacts.

Table VII-12: Predicted Annual Grade Crossing Injuries and Death in the Event of 25 Million Tons of Coal per Year are Shipping to Florida by Rail. Source: Coal Slurry Pipeline Study Committee (1980).

Predicted Annual Scenario-Specific Grade Crossing

Injuries and Deaths, 1985

	T_1[a]		T_2[a]		T_2-T_1		Number of	Coal Tonnage
Route	Deaths	Injuries	Deaths	Injuries	Deaths	Injuries	Crossings	(10^6 tons/yr)
Tracy City-Waycross[b]	6.0	23.6	6.5	25.2	0.5	1.6	480	16
Waycross-Tampa[c]	1.3	5.1	1.6	6.4	0.3	1.3	190	8
Waycross-Ft. Lauderdale[d]	4.1	15.9	5.4	20.9	1.3	5.0	281	8
TOTALS	11.4	44.6	13.5	52.5	2.1	7.9	951	32

[a] T_1 is the current number of trains per day as they appear in the grade-crossing inventory data.

$T_2=T_1$ plus the projected increase in coal trains per day.

[b] Average T_1 and T_2 are 20.7 and 35.3 respectively.

[c] Average T_1 and T_2 are 9.1 and 16.4 respectively.

[d] Average T_1 and T_2 are 22.4 and 29.7 respectively

Source: OTA Task Reports: Slurry Coal Pipeline

a. Water Quality Impacts -- A coal slurry pipeline requires about one ton of water for each ton of coal; therefore, if the pipeline transported 25 million tons of coal per year, it is expected to discharge about 16.5 million gallons of water per day (MGD). This amount is equivalent to about 10% of the cooling water needed for the power plants that would be served by the coal slurry pipeline. This water could either be treated and discharged into surface waters, or could be used as cooling makeup water for the power plant.

The greatest potential harm to the environment from the pipeline would be from the discharge of transport water, since the water would contain substantial amounts of contaminants. This water is likely to contain high levels of sodium, phosphate, sulfide, chromate, potassium, aluminum, lead, and iron, as well as have a high degree of alkalinity (i.e., a high pH value).

There is also the possibility of a leak or rupture from the pipeline, or a break in the levee surrounding a holding pond. Severity of an accident such as this would depend on the location of the damage, and the amount of slurry released.

b. Land Use Impacts -- The land use impacts of a coal slurry pipeline would depend on the exact route selected. In the absence of a specific route, land use impacts can only be estimated in a general fashion.

According to the Coal Slurry Pipeline Study Committee report, a pipeline following the general route shown in Chapter 1 would run through Florida for about 578 miles and would require about 6,936 acres of land in this state. Assuming a right-of-way (ROW) of 100 feet, requiring 12 acres per linear mile, the CSP might require about 2,688 acres of agricultural land, 294 acres of upland forest, and 60 acres of wetlands.

c. Air Quality Impacts -- Operation of the pipeline's pumps would require electricity equivalent to the output of a 300 MW power plant--with the corresponding air quality impact of a power plant that size spread the length of the pipeline.

3. Impacts of Coal Deliveries by Barge

As shown in Chapter 1, the most likely means of coal transportation for most new coal and coal-conversion power plants in Florida would be by barge. Of the five coal-fired plants under construction as of January 1, 1984, three (TECO's Big Bend 4, FPC's Crystal River, and JEA/FPL's St. Johns River Power Park) may use barge delivery. And of the 14 oil-fired plants studied by the U. S. Department of Energy for possible conversion to coal, eight plants are considered able to receive coal by barge. These eight are: Bartow (FPC), Canaveral (FPL), Ft. Meyers (FPL), Indian River (FPL), Northside (JEA), Port Everglades (FPL), Sanford (FPL), Turkey Point (FPL).

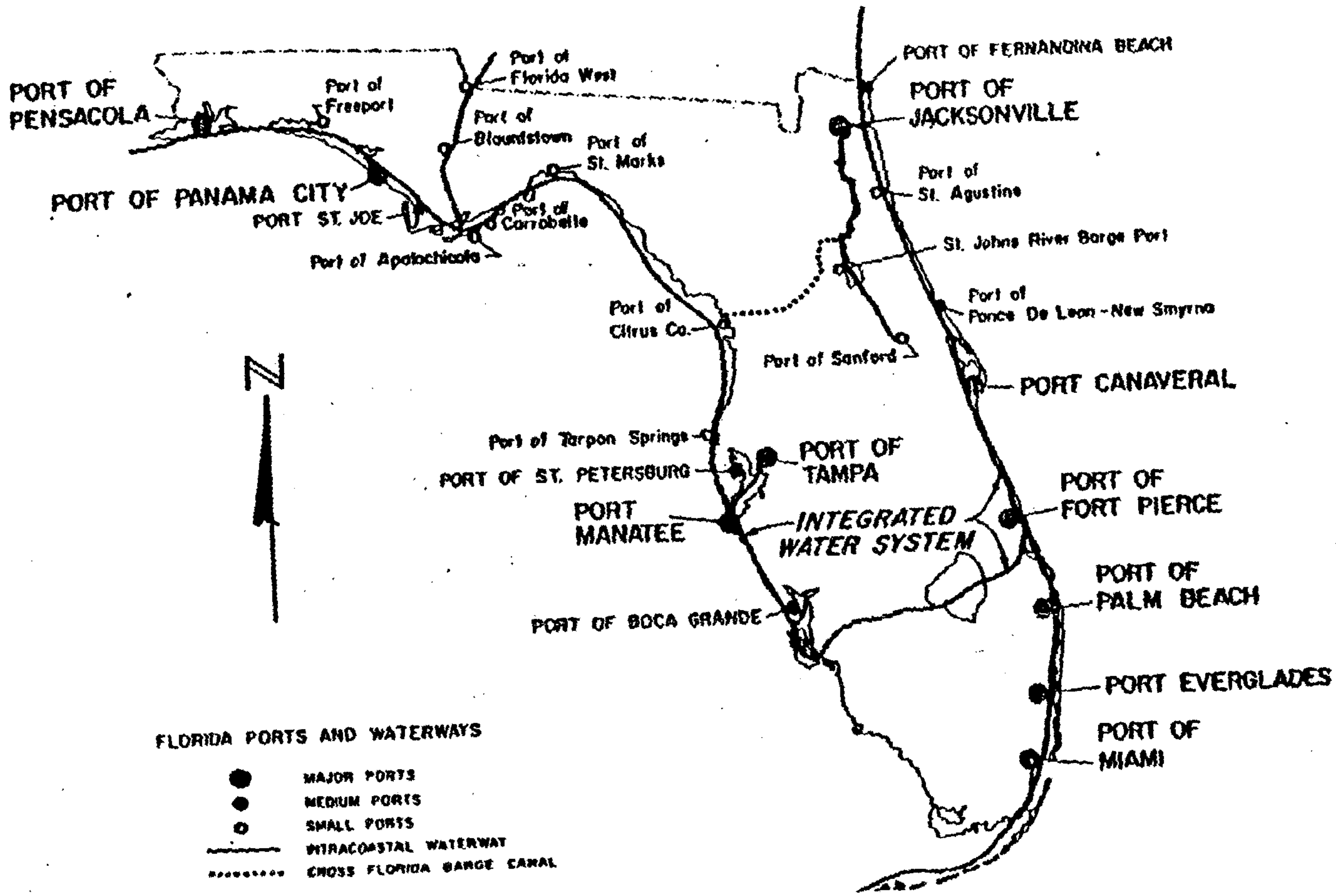
Major impacts of increased coal deliveries by barge would include construction impacts, maintenance impacts, and operational impacts:

a. Construction Impacts -- As seen in Fig. VII-7, Florida currently has 27 major ports and a lengthy network of inland waterways. However, to barge coal to specific power plants may require deepening of some waterways, and widening of others. Dredging causes destruction of river bottoms, and may stir up toxic materials and agitate sediments, killing fish by suffocation.

b. Maintenance Impacts -- It will be necessary to dredge channels routinely. The "spoil" (i.e., the dredged material) must be placed safely away from the channel. Keeping the channel free of weeds can cause damage to both plants and animals.

c. Operational Impacts -- Barge transportation brings with it the possibility of coal spills and some air impacts from the operation of diesel engines. In addition, there will be social impacts resulting from population growth and employment increases, especially around port and harbor areas.

Fig. VI-7. Ports and Waterways of Florida. Source: CSPSC (1980).



4. Traffic Impacts of Power Plants

The study by Gilmore of 15 power plants discussed in Part A of this chapter found that one of the major problems at the sites studied was construction traffic. Because of the problems represented by construction traffic, Power Plant Site Applications (PPSAs) usually include a section dealing with projected traffic levels. This sectionis particularly appropriate for planners who may review and comment on the traffic impact sectionof a PPSA. Identification of impacts can lead to recommendations and implementation of mitigative measures.

To help planners review PPSA traffic data and to consider actions that might be take to reduce the problem, this section summarizes the traffic volume projections of the JEA/FPL St. Johns River Power Park. In addition, the study of traffic levels actually measured at the Seminole construction site are shown, to compare with the projections presented in PPSAs.

a. St. Johns River Power Park -- Located close to Jacksonville and near major roadways, traffic congestion stemming from construction of the St. Johns River Power Park was a question of considerable importance. As seen in Table VII-13, the utility projected a peak workforce of 2,575. Assuming 1.2 persons per vehicle, the SJRPP PPSA predicted 3,700 daily trips (1,850 each direction) resulting from construction of the plant.

Assuming a 20 percent growth 1980 to 1985, the utility projected a peak construction traffic volume at one intersection to be above the "C Volume" (i.e., the traffic volume at which all traffic clears an intersection). To mitigate this undesirable impact, the EIS recommends the addition of traffic signals, street widening and redesign of five intersections.

Table VII-13: Projected Average Daily and Peak Hour Traffic Volumes in the St. Johns River Power Park Vicinity, 1980 and 1985. Source: Appendix S, Volume II, SJRPP EIS, Technical Support Documents (1981).

	1980 Average Daily Traffic	1980 Peak Hour Volume	Projected 1985 Average Daily Traffic	Projected 1985 Peak Hour Volume/ Level of Service C Volume
Heckscher Drive	10,265	835	16,136	2753/2600
Main Street	16,446	1,386	21,962	2605/5200
Eastport Road	7,591	615	10,459	1276/2000
New Berlin Road	1,636	159	5,781	1972/1800

ASSUMPTIONS:
- 20% Growth (1980-1985)
- 1.2 Persons per car

GIVEN:
- Construction Employment - 2,575 (1985 peak)
- Construction Truck Traffic - 37,200 in 1985 (peak)
- 90% work between 8:00 a.m. - 4:30 p.m.

b. <u>SECI's Seminole Units 1 and 2</u>--The PPSA submitted for SECI's Seminole plant included a description of existing traffic volumes, but did not project traffic levels that would be experienced during construction. According to a study by the Northeast Florida Regional Planning Council, five traffic count locations near the Seminole site experienced "dramatic" increases in average daily traffic during the peak construction year (1982).

In that year, traffic volume ranged from 60 percent to 93 percent higher than the levels experienced three years before; the total number of trips per day at nine count locations rose from 74,600 trips in 1979 to 102,000 in 1982. The utility took a number of actions to reduce traffic congestion, such as staggering shifts. According to the NEFRPC study, these were helpful in reducing delays.

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CHAPTER 8

ALTERNATIVES TO NEW CONSTRUCTION

CHAPTER 8

ALTERNATIVES TO NEW COAL-FIRED POWER PLANTS

As shown in Chapter 1, the state's Public Service Commission (PSC) is forecasting an enormous growth in electric power generation in Florida. According to the PSC's latest forecast, made in December of 1983, peak summer demand will rise from 19,649 MW in 1982 to 29,556 MW in the year 2003, an increase of 50 percent in 21 years. Almost all of this growth, says the PSC, would come from coal.

An increase in coal consumption of this magnitude could carry with it major implications for Florida's environment and would have a significant impact on the cost of electricity, on land use, and on Florida's transportation systems. Consequently, this chapter examines the costs and benefits of possible alternatives to new coal capacity. Part A examines energy conservation and residential renewable energy resources such as solar energy. Part B looks at production alternatives such as nuclear power, peat and natural gas, as well as several renewable energy generating alternatives, such as the use of municipal wastes, cogeneration and hydropower.

For a power plant to be certified in Florida, the PSC must first issue a "Determination of Need" order. This chapter is designed to assist planners becoming involved in the PSC's Determination of Need proceedings. (See Chapter 2 for further information on the PSC Determination of Need process.)

A. CONSERVATION AND RENEWABLE ENERGY RESOURCES

In considering alternatives to all or part of any proposed capital expansion as part of the PSC Need for Power Determination, planners may want to give careful consideration to energy conservation and renewable energy resources. This section reviews FEECA (the Florida Energy Efficiency and Conservation Act) under which utilities operate conservation programs, and then examines the degree to which intensified conservation and renewable energy resource programs could offset the need for additional amounts of coal-fired capacity.

1. The Florida Energy Efficiency and Conservation Act

In 1980, the Legislature of Florida adopted the Florida Energy Efficiency and Conservation Act (FEECA), Sect. 366.82(2), Florida Statutes. This act directed the Florida Public Service Commission to:

> . . .adopt appropriate goals for increasing the efficiency of . . . energy consumption, specifically including goals designed to increase the conservation of expensive resources, such as petroleum fuel, and to reduce the growth rates of electric consumption and especially weather-sensitive peak demand.

Based on this legislation, in September of 1980 the PSC adopted conservation goals for Florida's electric utilities. Under the FEECA regulations:

-- The growth in kilowatt-hour sales must not be more than 75% of the average annual growth rate of residential customers.

-- Winter and summer peak KW demand must not grow more than 72.25% of the average growth of residential customers.

-- Oil consumption must be reduced by 1989 to less than 58.734 million barrels per year (compared with the 69.994 mill. bbl. utilities consumed in 1980).

Later in 1980 electric utilities submitted plans to achieve the FEECA goals; a number of these FEECA plans are included in the Bibliography, Section 4. Table VIII-1 shows the FEECA programs and projected savings of the three-largest electric utilities of Florida. The FEECA plans submitted by the major electric utilities of Florida are important documents which could be of significant value to planners involved with the PSC Need for Power Determination process.

According to the PSC, the FEECA program will reduce the need for new generating capacity in 1989 by 6,917 megawatts (MW), compared to projections made in 1979, a projected reduction of 18.3 percent. (See Table VIII-2). A reduction of 6,917 MW is approximately equivalent to avoiding the construction of eleven new 600 MW coal-fired power plants. According to the PSC, this represents a cost avoidance of an estimated $8.5 billion. (See Fig. VIII-1).

Table VIII-1: Effects of the FEECA PSC Conservation Goals.
Source: Florida PSC (1982).

	1979	1989	1989 Goal	1989 Savings	Pct. Savings
Nr. of Residential Customers (Mill)	3.9	5.3	--	--	--
Kilowatt-Hours (Bill)	93.8	144.7	123.7	21.0	14.5
Summer Peak (GW)	18.0	28.2	24.6	4.9	17.4
Winter Peak (KW)	20.0	30.7	24.6	6.1	19.9
Generating Capacity (Bill. KW)	24.9	37.7	30.8*	6.9	18.3

*If goal achieved.

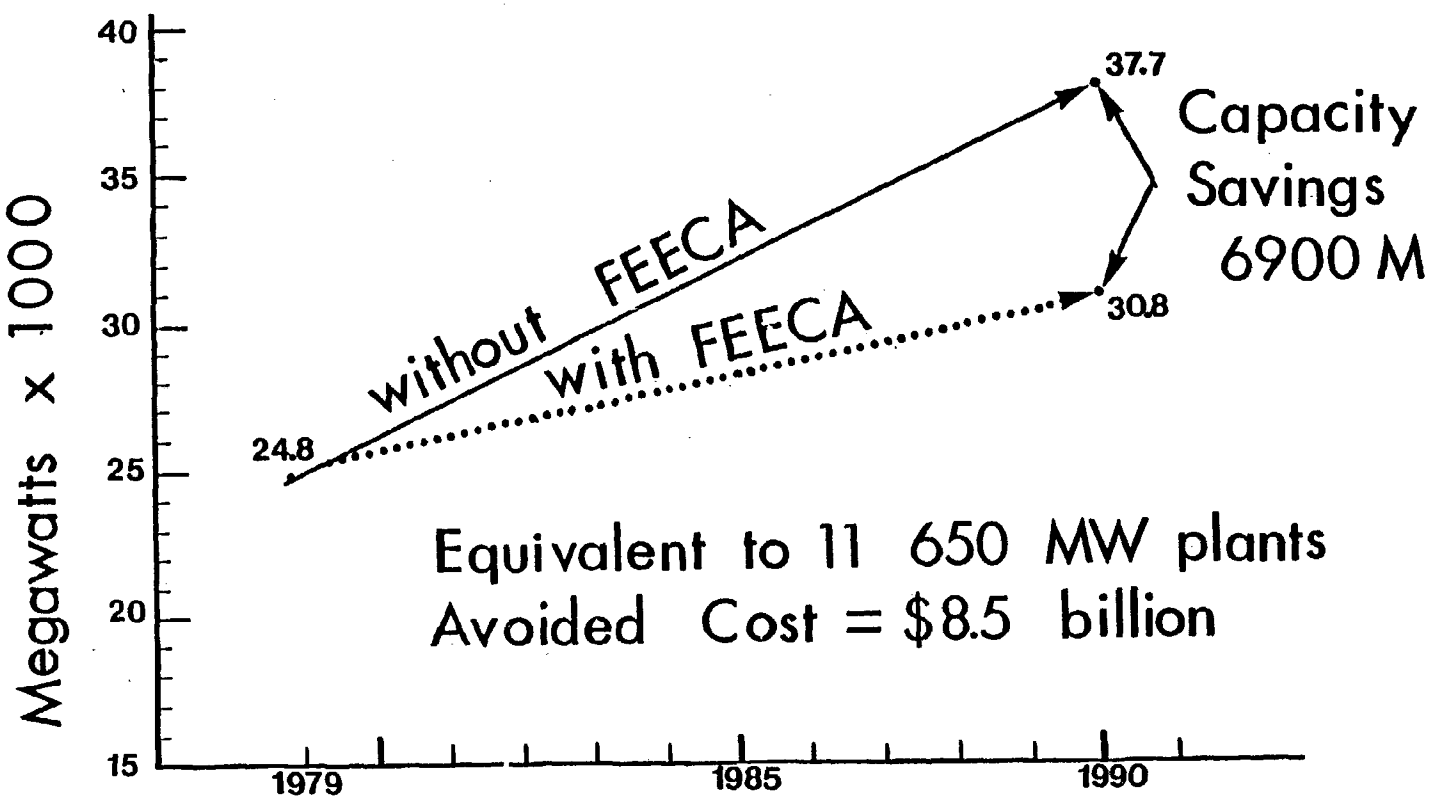
Table VIII-2: Projected 1990 Savings for Selected Major Conservation Programs for FPL, FPC and TECO. Source: DOE/SAI (1983).

	1990 Cumulative Savings Winter MW	Summer MW	GWh	Penetration of Potential Market (%)
FP&L				
Residential Audits	-	-	-	28
Water Heater Insulation	10	6	35	-
Reflective Window Film	0	24	91	17
Residential Ceiling Insulation	40	40	149	15
High Efficiency Cooling and Heating Appliances (cash incentive)	661	584	2232	10
Efficient Home Credit	385	385	1544	(about 20%)
Comm./Ind. Energy Analysis	74	74	475	19
High Pressure Sodium Steet Lights	0	0	200	100
Pool Pump Timers	104	173	164	72
Residential Load Control	180	162	0	25.4
Residential and General Service TOD Rates	233	233	202	9.7
C/I TOD Rates	189	189	252	1.9
High Efficiency Water Heaters	28	104	613	15
Cogen. & Small Power Production	171	203	992	-
Retail Appliance Dealer Program	29	72	1017	50
Total	2104	2249	7966	
TECO				
Heat Pumps	217.0	0	16.7	Not Specified
Storage Water Heating	73.1	29.5	0	
Energy Efficient Buildings Award (residential)	2.5	7.2	26.0	
(C/I)	7.5	9.8	40.0	
Audits (Residential)	7.0	5.0	22.0	
(Commercial)	.53	1.23	14.0	
(Large C/I)	.53	15.0	30.0	
Load Control	88.7	64.8	0	
Cogeneration	15.0	15.0	52.5	
C/I Interruptible	13.0	13.0	-	
High Pressure Sodium Street Lights	0-6.0	0	23.0	
Total	425-431	160	224	

FPC	MW	GWh	
Residential Audits	48.4	145.1	Not Specified
Supplemental Audits	28.4	323.9	
C/I Audits	50.6	126.9	
Energy Saver New Construction	124.0	324.7	
C/I Energy Efficiency Award	17.6	44.1	
Cogen. & Small Power Production	66.0	330.0	
Conservation Equipment Incentive	72.0	170.0	
Home Fix-up (a)	13.7	153.3	
Education (b)	4.1	11.6	
High Pressure Sodium Street Lights	8.8	37.0	
Resid. Conservation Financing (b)	15.3	76.7	
Load Management	662.0	23.9	
Total	1071	1767	

[a] Includes 30% interaction with other conservation programs
[b] Includes 90% interaction with other conservation programs
Sources: FP&L 1982, FPC 1980, TECO 1980

Fig. VIII-1: Projected Savings of FEECA on Generating Capacity, 1979 - 1989. Source: Florida PSC (1982). Note that these savings were projected using the PSC 1979 forecast. Since the current forecast is different, savings projected in Fig. VIII-2 are somewhat different.



Despite the savings resulting from FEECA, the Florida Electric Coordinating Group (FCG) predicts that by 1992 Peninsular Florida will have a total of 34,237 MW of installed powerplant capacity, 22 percent higher than 1983. Since the initiation of the FEECA program, the PSC has certified the need for 1,967 megawatts of new coal-fired capacity "to displace imported oil." Thus the certification of new units has reduced the tangible benefits of FEECA and has contributed to extraordinarily high reserve margins in Florida.

Because other factors such as increasing prices and federally-mandated conservation-programs are also at play at the same time, it is difficult to know the extent to which FEECA alone achieved these projected savings of needed new capacity. In the PSC reports on the FEECA program, the PSC ~~does~~ has not estimated the extent to which price increases may have contributed to reducing consumption. And no comparisons are made between conservation in Florida with FEECA, and conservation actions that take place in other states without the FEECA program. For these reasons, it is difficult to indicate exactly what contribution the FEECA program itself has had in reducing the need for new capacity.

In December of 1981, the PSC amended its power plant siting regulations (Section 25-22.81, Florida Administrative Code) to require utilities seeking certification to include an analysis of both "generating alternatives" and "nongenerating alternatives." According to the regulations, the application is now to include:

> A summary discussion of the major available generating alternatives which were examined and evaluated in arriving at the decision to pursue the proposed generating unit. The discussion shall include a general description of the generating unit alternatives, including purchases where appropriate...[and] a discussion of viable nongenerating alternatives including an evaluation of the nature and extent of reductions in the growth rates of peak demand, KWH consumption and oil consumption resulting from the goals and programs adopted pursuant to the Florida Energy Efficiency and Conservation Act both historically and prospectively and the effects on timing and size of the proposed plant.

There is not yet enough experience with this new requirement to indicate what effect it may have on the PSC Need for Power Determination process. But it is likely that these regulations will require far more attention to alternatives than previous applications have given.

2. Opportunities for Intensified Conservation

The reduction in new coal-fired construction resulting from FEECA conservation programs appears significant, but there is evidence that this program could be intensified manyfold, and that additional savings could result. Planners becoming involved with PSC's Need for Power Determination process will need to consider the extent to which conservation and renewable energy resources could economically offset the need for some or all of the capacity needs stated by the utility.

Although relatively few studies of the potential for conservation and renewable resources to offset the need for new power plant construction in Florida have been conducted, there are several prominent ones which planners should consult. These include:

(1) Alternatives to Coal Conversion, prepared for the U. S. Dept. of Energy by Science Applications Inc. and published in October of 1983

(2) Florida's Electric Future: Building Plentiful Supplies on Conservation, written by Capehart et al., and published in 1982 by the Florida Conservation Foundation.

(3) Major nationwide studies, such as the CONAES study, the SERI study, the Harvard study, the Sant study, and the California study.

In considering alternatives to constructing new coal-fired capacity, planners must bear in mind that in terms of 1983 dollars, the cost of new units, according to the FCG, is $1730 per KW (kilowatt). Therefore, other factors being equal, if the projected cost of a particular conservation or alternative energy measure offsets the need for new capacity at a rate less than this amount, it is in the economic interest of both the consumer and the utility to opt for the conservation measure, not new construction. However, there are other factors, such as reliability and finance, which also must be taken into consideration.

a. DOE/SAI Study

In 1983 the consulting firm of Science Applications, Inc., prepared a report entitled The Florida Statewide Coal Conversion Study: Alternatives to Coal Conversion for Florida Utilities. Published by the U. S. Dept. of Energy, the study was commissioned at the request of the Florida Public Service Commission.

As shown in Table VIII-3, in the judgment of the SAI researchers, an aggressive program of energy conservation, cogeneration and use of wastes for fuel could reduce peak megawatt demand by 9.3 percent in 1990, compared with projections made by the electric utility industry which already included the effects of FEECA.

Of the 2,380 MW of peak summer demand that SAI claims would result from its proposals, 1200 MW (50 percent) would be achieved through residential conservation and load control; 700 MW (29 percent) through commercial sector conservation measures; 110 MW (5 percent) from the industrial sector; 130 MW (5 percent) from the combustion of municipal wastes; and 240 MW (10 percent) from industrial cogeneration. These savings are over and above the savings projected from FEECA.

A reduction of 2380 MW is equivalent to the net output of four 600 (net) MW power plants. At a cost of $1,730 per KW (in 1983 dollars) this would represent a cost avoidance of some $4.12 billion in construction costs. These savings are, however, hypothetical because in actuality the conservation program might simply bring about only reduced use of existing plants, and a larger reserve margin, rather than actual reductions.

SAI believes that 12,830 GWH can be saved by its recommendations. In Fig. VIII-2 this amount is compared both with the 1983 PSC forecast of 142,633 GWH for 1992 and with the effects of other conservation programs.

Table VIII-3: Conservation and Alternative Energy Source Offering Significant Reductions in Projected 1990 Loads. Source: DOE/SAI (1983).

	Reduction in Annual Demand (GWh)	Average Reduction in Demand (MW)	Average Reduction in Winter Peak Demand (MW)	Average Reduction in Summer Peak Demand (MW)
Residential Conservation and Load Control • Increased Insulation/ Weatherization • Appliance and Lighting Efficiency • HVAC Improvements • Load Control	4700	540	700	1200
Commercial Sector Conservation • Lighting Efficiency • Waste Heat Recovery • Insulation • HVAC Efficiency	3300	370	400	700
Industrial Sector • Motor Efficiency • ACS	940	110	110	110
Alternative Fuels • Municipal Solid Waste	1130	130	130	130
Cogeneration • Phosphate Industry • Other Industrial	2110	240	240	240
Total Reductions	12,180	1390	1580	2380
Percent of Projected Loads[a]	9.2%	9.2%	5.8%	9.3%

[a]Compared to projected 1990 loads in FCG 1982 Plan

b. FCF Study

In October of 1982, the Florida Conservation Foundation (FCF) published Florida's Electric Future: Building Plentiful Supplies on Conservation: A Proposed State Electric Conservation Policy, whose principal author was Dr. Barney Capehart, an engineering professor at the Univ. of Florida. The Capehart study was an outgrowth of studies funded by the STAR program of the Board of Regents, conducted at the request of the Governor's Energy Office.

As seen in Table VIIII-4, the FCF study concludes that an aggressive conservation program could offset the need for eight 600-MW Florida power plants at today's population, and 17 by the year 2005. According to the authors, there is no need to certify another Florida power plant in this century, if cost-effective conservation and alternative energy sources are used to meet the energy demands of Florida's ever-growing population. All these projected savings are over and above those projected for the FEECA program.

This study compared the cost of offsetting the need for new construction with the cost of a number of conservation measures. The conclusions reached by the FCF study are shown in Table VIII-5 as the "Utility Payback Ratio." If the cost of the measure is projected to offset the need for new capacity at the same cost as new construction, its ratio would be 1.0; if the ratio is higher than 1.0, the researchers maintained that it would be in the economic interest of both the utility and the customer to opt for the conservation measure rather than new construction. As seen in Table VIII-5, most of the measures had a ratio higher than 1.0. The FCF program assumed the utilities would subsidize the cost of most measures; the study considered only residential energy conservation measures.

The FCF study projects a near-term savings of 460 million barrels of oil. Assuming 6.3 MMBtu per bbl and 10,000 Btu per kWh, this is equivalent to a savings of 39,000 GWH, 27 percent below the PSC forecast for 1992 of 142,633 GWH. This level of savings is compared with the SAI/DOE savings and with utility savings projections in Fig. VIII-2.

Table VIII-4: Power Plant and Fuel Savings Possible from Conservation Alternatives. Source: FCF (1982).

Scenario	Computed From Present Population		Simulated Using Year 2005 Population	
	600-MW Plants Saved	Barrels of Oil Saved/Yr	600-MW Plants Saved	Tons of Coal Saved/Yr
1. High efficiency electrical appliances	5.2	3.1×10^7	10.8	4.5×10^6
2. High efficiency A/C and refrigerators and direct use of gas, oil and coal	7.2	4.1×10^7	14.8	4.0×10^6
3. High efficiency appliances and building improvements	6 2	3.6×10^7	13.2	5.4×10^6
4. High efficiency appliances and maximum use of solar	6.2	3.6×10^7	13.3	5.5×10^6
5. Combination of 2 and 3 (short term)	7.9	4.6×10^7	17.0	6.4×10^6
6. Combination of 3 and 4 (long term)	7.0	4.0×10^7	15.0	6.3×10^6

Table VIII-5: Economic Ranking of Conservation Alternatives. Source: FCF (1982).

Alternative	Electrical Energy Savings, KWH/yr	Purchase Cost or Cost Difference	Energy Cost Savings Per Year	Utility Payback Ratio	Customer Payback Period, Years	Customer Return on Investment, Percent	Customer Benefit Cost Ratio	KWH/Yr Saved Per $/Yr Spent	Utility Dollar Savings Per Dollar of Customer Cost
SPACE HEATING									
Heat Pump—State	2493	$ 780	$149.88	1.6	5.2	12.5	1.5	48	4.3
Heat Pump—N. Florida	3900	$ 780	$234.00	2.7	3.3	23.3	2.4	75	6.8
Heat Pump—S. Florida	848	$ 780	$ 50.88	0.6	15.3		0.5	16	1.5
Wood—State	3315	$1020	$104.40	1.8	9.8	6.9	0.8	26	2.3
Wood—N. Florida	5175	$1020	$148.15	2.8	6.9	11.2	1.1	26	2.4
Gas (Conv.)—State	4420	$ 150	$167.76	15.0	0.9	106.8	8.7	41	3.8
Gas (Conv.)—State (gas price up 50%)	4420	$ 150	$119.04	15.0	1.3	74.4	6.3	29	2.6
Gas (Conv.)—S. Florida	1500	$ 150	$ 57.00	4.5	2.6	33.0	3.0	37	3.3
Gas (Hi-Eff)—State (over conv. gas)	4420	$ 150	$ 23.52		6.4	10.7	1.2		
Gas (Hi-Eff)—N. Florida (over conv. gas)	6900	$ 150	$ 36.72		4.1	19.5	1.9		
Coal—State	3315	$1145	$165.69	1.6	6.9	11.1	1.1	39	3.5
Coal—N. Florida	5175	$1145	$253.98	2.8	4.5	18.8	1.8	55	5.8
Oil (Conv.)—State	4420	$ 200	$ 56.58	11.3	3.5	18.3	2.2	20	1.8
Oil (Hi-Eff)—State (over conv. oil)	4420	$ 120	$ 50.02		2.4	36.7	3.3		
HOT WATER HEATING									
Insulation Jacket with Thermostat Reduction	480	$ 26	$ 28.80	6.8	0.9	104.1	8.8	277	24.9
Timer	480	$ 50	$ 28.80	2.8	1.7	50.9	4.6	36	3.2
Dedicated Heat Pump	2520	$ 760	$151.20	1.4	5.0	13.2	1.6	50	4.5
Heat Recovery Unit	2520	$ 430	$151.20	(3.9)	2.8	28.5	2.8	88	7.9
Solar with Electric Backup	2520	$1865	$151.20	0.5	12.3	3.1	0.6	27	2.4
Solar with Electric Backup and 40% Tax Credit	2520	$1025	$151.20	0.9	6.8	9.8	1.2	49	4.4
Solar with Backup Restricted to Off-Peak and 40% Tax Credit	2520	$1025	$151.20	1.1	6.8	9.8	1.2	37	3.3
Solar without Backup, with 40% Tax Credit	3600	$1025	$216.00	1.5	4.7	16.1	1.7	70	6.3
Conventional Gas	3600	$ 45	$132.00	11.5	0.3	286.7	23.2	42	3.8
Gas (Hi-Eff) (over conv. gas)		$ 120	$ 20.16		6.0	10.1	1.3		
Oil	3600								

Table VIII-5: (Cont'd)

Alternative	Electrical Energy Savings, KWH/yr	Purchase Cost or Cost Difference	Energy Cost Savings Per Year	Utility Payback Ratio	Customer Payback Period, Years	Customer Return on Investment, Percent	Customer Benefit Cost Ratio	KWH/Yr Saved Per $/Yr Spent	Utility Dollar Savings Per Dollar of Customer Cost
SPACE COOLING									
High-Efficiency Air Conditioners—State	1328	$ 630	$ 79.68	[1.4]	7.9	6.0	1.0	32	2.9
High-Efficiency Air Conditioners—S. Florida	2143	$ 630	$128.58	[2.3]	4.9	13.7	1.6	51	4.6
Ceiling Fans	1395	$ 300	$ 83.70	[3.1]	3.6	21.2	2.2	70	6.3
REFRIGERATION									
High-Efficiency Refrigerators	1089	$ 200	$ 65.00	2.0	3.1	25.8	2.6	82	7.4
BUILDING MODIFICATIONS									
Added Attic Insulation	1179	$ 570	$ 70.74	0.8	8.1	12.4	1.0	31	2.8
Caulking and Weatherstripping	540	$ 168	$ 32.40	1.0	5.2	12.6	1.5	48	4.3
Storm Windows	1135	$ 636	$ 68.10	0.7	9.3	7.4	0.8	27	2.4
Passive Solar Landscaping	1860	$1000	$111.60	[1.2]	9.0	7.8	0.9	28	2.5
UTILITY PROGRAMS									
Time-of-Day Rates	500	$ 100	$ 30.00	1.8	3.3	23.3	2.4	75	6.8
Inverted Block Rates	50		$ 3.00						
Voltage Reduction—State	700 GWH								

c. Nationwide Studies

In addition to these two Florida-specific studies, there have been a number of prominent nationwide studies on the potential of conservation and renewable resources to offset the need for new capacity. While a handbook on power plant siting in Florida cannot detail these studies in depth, it is worthwhile noting several of the most important of these investigations; see the Annotated Bibliography, Section 4, for synopses of some of these studies.

3. Utility Position

The Florida Electric Coordinating Group (FCG) does not agree that significant additional savings are feasible. As shown in Fig. VIII-2, the FCG maintains that an intensified energy conservation program would only save about one percent of projected power. Applying this amount to the 142,633 GWH projected by the PSC in December of 1983 for 1992, this translates into a savings of about 1426 GWH, equivalent to a capacity savings of about 278 MW, ~~roughly~~ less than half the output of one 600-MW plant.

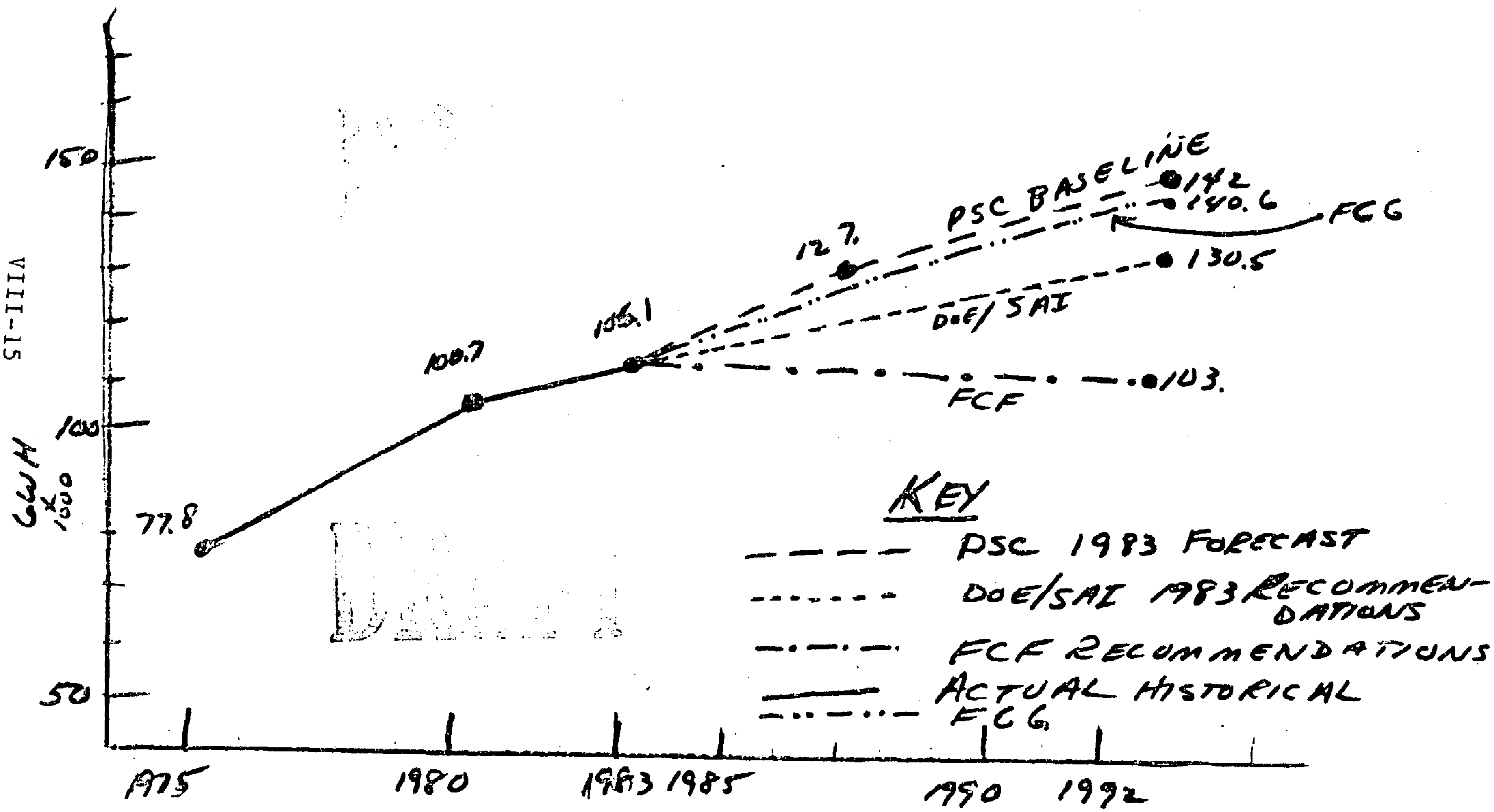
There are three reason for this, according to the FCG:

1. Portfolio Interaction -- Conservation measures are not additive.

2. Rebound Effect -- Some customers who install conservation measures will choose to increase comfort levels rather than decrease consumption.

3. Saturation -- Only a limited percentage of all customers will avail themselves of cost-effective conservation measures.

Fig. VIII-2: Projected GWH Savings from Three Intensified Energy Conservation Programs: SAI/DOE Program, FCF Program and FCG Program. Sources: Baseline projections: PSC (Dec., 1983); FCF (1982); SAI/DOE 1983); FCG (1983).



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This 1977 report of the Department of Energy, entitled Distributed Energy Systems in California's Future, presents an energy future for the state of California which emphasizes the potential for the state to achieve a self-sufficiency in energy resources through the use of a renewable, decentralized energy production and distribution system. While a number of measures studied--on-site solar, waste-to-energy conversion, energy farms, etc.--are applicable to Florida, some measures, such as hydroelectric, geothermal power and wind energy, have little application in this state.

Sant, Roger. The Least-Cost Energy Strategy: Minimizing Consumer Costs Through Competition. (Carnegie-Mellon Institute, 1979).

In 1979 the Energy Productivity Center of the Carnegie-Mellon Institute under Roger Sant, a former Assistant Administrator of the Federal Energy Administration, published The Least-Cost Energy Strategy: Minimizing Consumer Costs Through Competition. In this study Sant maintains that if conservation is chosen, prices to consumers would be reduced by 17 percent of 1978 costs. This would lead to a 22 percent gain in energy efficiency.

Stobaugh, Robert and Yergin, Daniel (eds.) Energy Future: Report of the Energy Project at the Harvard Business School. (Random House, 1979).

In 1979 Robert Stobaugh and Daniel Yergin, professors at the Harvard Business School, published Energy Future: Report of the Energy Project at the Harvard Business School. This report concluded that 40 percent of the nation's energy needs by the year 2000 could be met by conservation, and 20 percent from solar.

Committee on Nuclear and Alternative Energy Systems. Alternative Energy Demand Futures to 2010. (Washington, D. C.: National Academy of Sciences, 1979).

In 1979 the Committee on Nuclear and Alternative Energy Systems of the National Academy of Sciences produced a report which concluded that it would be technically feasible for the nation to consume the same amount of energy in the year 2010 as was consumed in 1980. The CONAES study predicted that, compared with 1975, by the year 2000, the energy efficiency of electric space heating could become 57 percent of the 1975 level, the energy efficiency of refrigerators could be 58 percent of 1975, and the energy efficiency of air conditioning could be 66 percent of 1975.

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B. GENERATING ALTERNATIVES

Each Power Plant Site Application (PPSA) submitted in Florida in recent years has included a section which examines "alternatives" to the proposed plant. In general, the alternatives which have received serious attention are generating options, such as nuclear power, conversion of oil-fired boilers to coal and natural gas. This section reviews the way alternatives have been treated in several typical PPSAs and provides a brief review of the costs and implications of alterantives to construction of new coal-fired power plants.

1. Alternatives in Recent PPSAs

the way in which "alterantives" have been considered in site certification applications can be seen in two case studies: (1) the application of the Orlando Utilities Commission for the Stanton 1 plant; and (2) the application of JEA and FPL for the St. Johns River Power Park.

a. OUC Stanton 1 Application -- In the Need for Power application of the Orlando Utilities Commission for the Stanton 1 plant filed in May of 1981, the utility included a section which briefly mentioned 18 alternatives. Seven of these were generation alternatives, including nuclear power and purchased power; eleven were renewable energy alternatives, such as wind energy, ocean thermal energy, cogeneration, solar energy and hydro power.

The OUC application dismissed in turn each of the "high technology" alternatives--such as satellite solar, ocean thermal energy and photovoltaics--stating that the commercial operation date of each would be far in the future. No attempt was made in the application to assemble a package of currently available conservation and renewable resource technologies to offset the need for all or part of the proposed plant.

b. JEA/FPL St. Johns River Power Park--The Environmental Impact Statement prepared for the JEA/FPL St. Johns River Power Park included four "alternatives:"

> Alternative 1 -- Use of refuse as a power source, residential solar energy, conversion of two existing JEA oil-fired units to coal, and purchase of some power from Georgia.
>
> Alternative 2 -- Conversion of two FPL oil-fired units to coal, and purchase of additional power from Georgia.
>
> Alternative 3 -- Conversion of two FPL oil-fired units to coal, purchase of power from Georgia, and construction of a much smaller (280 MW) coal-fired plant at the SJRPP site.
>
> Alternative 4 -- Conversion of two FPL and two JEA oil-fired units to coal, and purchase of additional power from Georgia.

Thus, these four alternatives were almost exclusively devoted to production alternatives: conversion of oil-fired units to coal, importation of nuclear power from Georgia, and production of power from municipal urban wastes. Little attention in the SJRPP EIS was given to solar energy, and none to end-use conservation. As seen in Table VIII-6, the federal Environmental Protection Agency concluded that construction of two new coal-fired units would be less costly than these four alternatives.

Table VIII-6: Projected Cost in Terms of Dollars per Barrel off Oil Burned or Displaced by Alternative Technologies. Source: JEA/FPL SJRPP EIS (1981).

	$ per Bbl. of Oil Saved or Consumed					
	JEA			FPL		
System	H	M	L	H	M	L
No action	40.67	32.95	23.13	40.39	32.67	22.85
Proposed action (SJRPP)	20.74	17.83	14.13	26.95	23.80	19.81
Vogtle (without transmission costs or interim purchase of power)		15.19			29.08	
Coal conversion:						
Sanford without scrubber		-----			19.27	
Sanford with scrubber		-----			22.45	
Northside without scrubber		23.11			-----	
Northside with scrubber		24.54			-----	
Coal-oil mixture (Northside)		17.62			-----	
Small coal plant		21.37			-----	
Solar domestic hot water		37.91			62.28	
Refuse-fired generation		21.77			37.21	

Key: H = high oil and coal prices
M = medium oil and coal prices
L = low oil and coal prices

2. Comparison of Generating Alternatives

In reviewing a PPSA, planners should carefully consider the possibility that the need for all or some of the proposed capacity construction could be offset by some other generating alternative. For each of the alternatives, the planner should examine the projected cost in terms of dollars per kilowatt of capital cost and cents per kWh of power produced compared with coal. In 1983, the Florida Electric Coordinating Group projected that the cost of a 600-MW coal-fired powerplant going on-line in 1987 would be $1740/kW (see Chapter 1).

Alternatives to be evaluated should include:

--importation of power generated elsewhere
--use of cogenerated power
--conversion of certain oil-fired plants to coal
--combustion of municipal urban waste for power production
--combustion of wood as a fuel
--use of nuclear power
--use of coal-oil mixture in an oil-fired plant
--use of coal-water mixture in an oil-fired plant
--increased use of natural gas
--peat as a fuel

Several of these options are discussed briefly below. For information on conversion of oil-fired units to coal, see Chapter 1; for information on the importation of electricity from other states, see Chapter 10.

a. Nuclear Power--Florida currently has five nuclear power plants and nuclear power provides aobut 10 percent of all power produced in the state. Ass seen in Fig. VIII-3,four of these plants, owned by Florida Power and Light, are located in South Florida; one nuclear plant, owned by Florida Power Corp., is located at the Crystal River plant 100 miles north of St. Petersburg. Five orders for nuclear plants in Florida have been canceled, and there is no indication in the current Ten-Year Plan of the Florida electric utility industry that nuclear power is being seriously considered as an option.

In addition to questions of the safety and environmental impacts of nuclear power, the cost of nuclear power has been a major consideration: It is estimated that a nuclear plant contracted for in 1984 would cost about $3,000 per kilowatt (kW), about 73 percent higher than the cost of a new coal-fired plant as projected by the FCG. The latest nuclear unit to go on-line in Florida, FPL's St. Lucie 2, was completed for $1.4 billion, four times its original estimate of $360 million.

b. Peat Fuel--Peat, a substance similar in nature to "young coal," is used as a fuel for power plants in Canada, Ireland and the Soviet Union. Florida has some of the largest peat ~~deposits in the nation:~~ as shown in Fig. VIII-4, Florida's peat deposits are found both in North Central Florida and in South Florida, near Lake Okeechobee (See Fig. VIII-4).

Seminole Electric Coop. has discussed the construction of three peat-fired powerplants of 100 (net) MW each, and the 1982 Ten-Year Plan of the FCG forecast that by 1992 Florida would have three 300 of MW peat-fired capacity in operation, generating 1843 GWH annually, equivalent to about 1.3 percent of all power produced in the state. These plants are not currently being listed in the utility's Ten-Year Plan, but because of the extensive peat deposits in Florida, there is a real possibillity that peat may be considered in future years.

c. Combustion of Wastes for Power Production--A recent study indicated that Florida could econmically obtain up to about tenpercent of its electric power needs from the combustion of refuse.As shown in Fig. VIII-5, approximately 17 communities in Florida that are burning refuse to produce electricity or are considering its feasibility. The nation's largest refuse-to-energy plant is located in Dade County; a large plant is located in Pinellas County, and another one is planned for Hillsborough County.

d. Ocean Thermal Energy Conversion--As an experimental technology, OTEC will see only limited application this century. However, there are plans to request federal assistance for projects throughout the nation, including Florida, and the Governor's Energy Office has forecast that by the turn of the century OTEC may account for about 70 MW of capacity off the shores of Florida.

e. Hydropower--Florida, as one of the flattest states in the nation, is obviously not a prime candidate for hydroelectric power production. However, several studies conducted for the U. S. Department of Energy and coordinated by the Governor's Energy Office have indicated some potential for "low-head" hydro in Florida. The GEO has forecast that hydropower will rise slightly during this century with the addition of two or three small hydro facilities.

f. Gulf Stream Current--It has been estimated that the energy available in the Gulf Stream is equivalent to 25 1000-MW power plants. Howver, harnessing this energy source for commerical power is still experimental. To produce 2000 MW would require about 50 turbines, each 550 feet in diameter.

Fig. VIII-3: Nuclear Power Plants in Florida.

NUCLEAR POWER PLANTS
IN FLORIDA

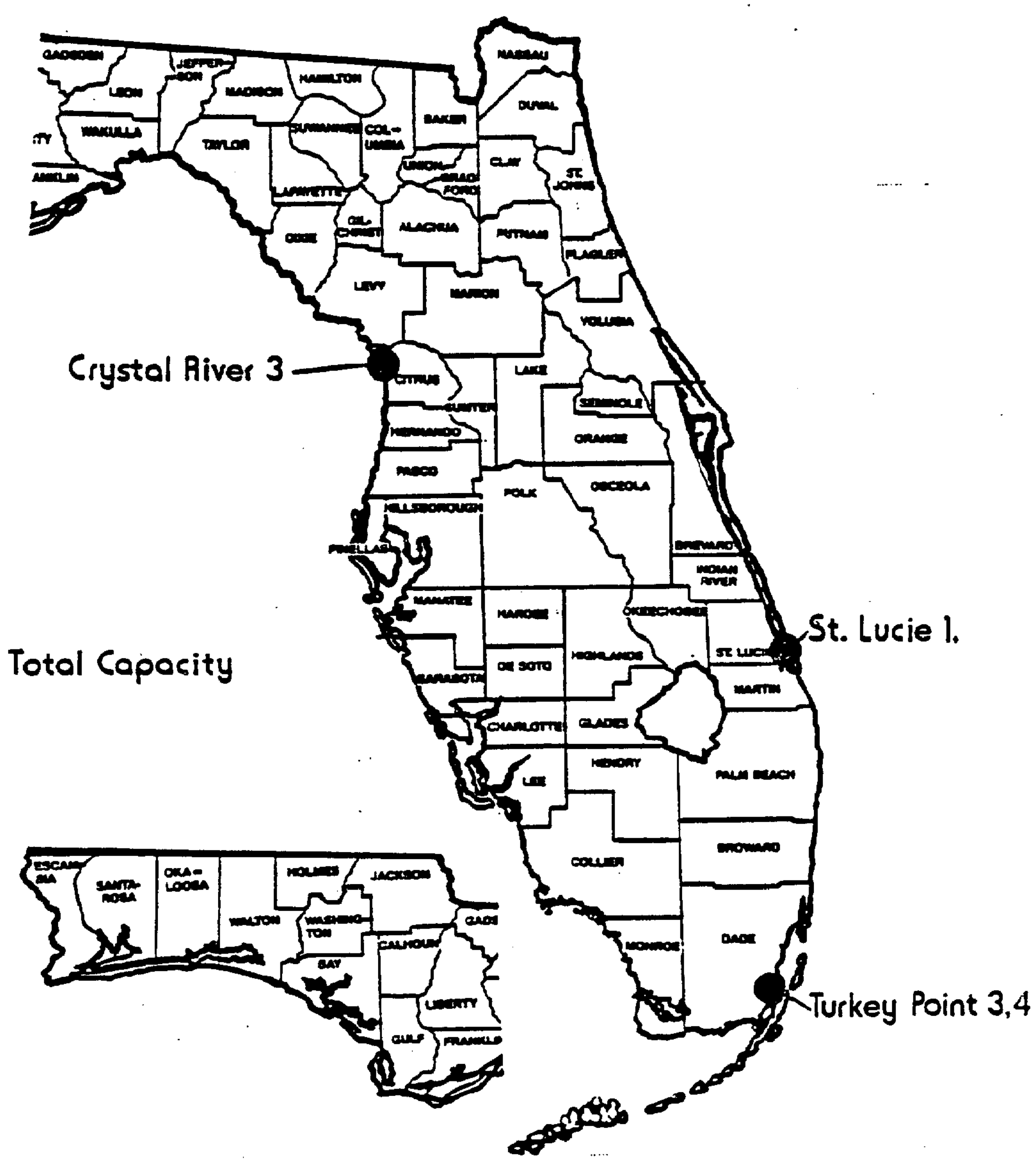


Fig. VIII-4: Peat Deposits in Florida.

MAJOR PEAT DEPOSITS IN FLORIDA

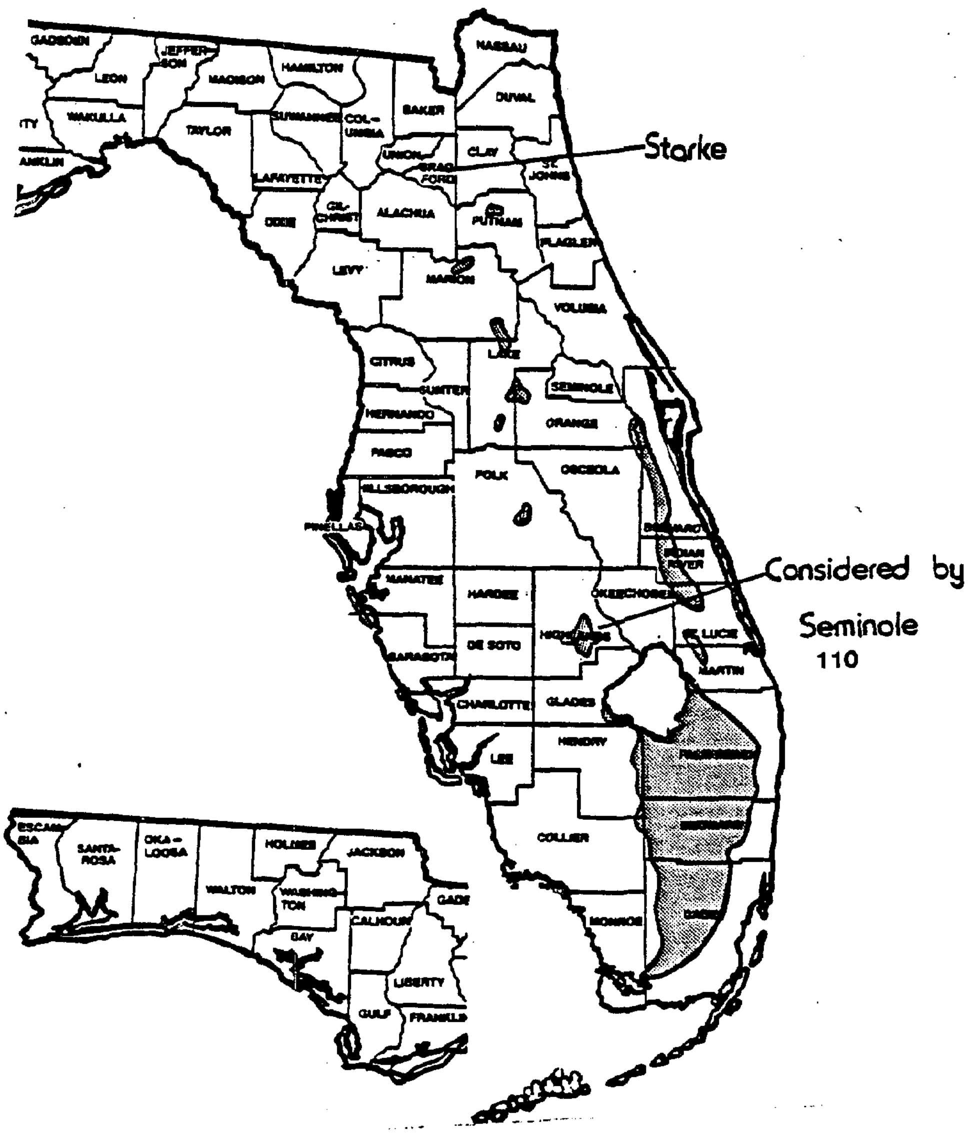
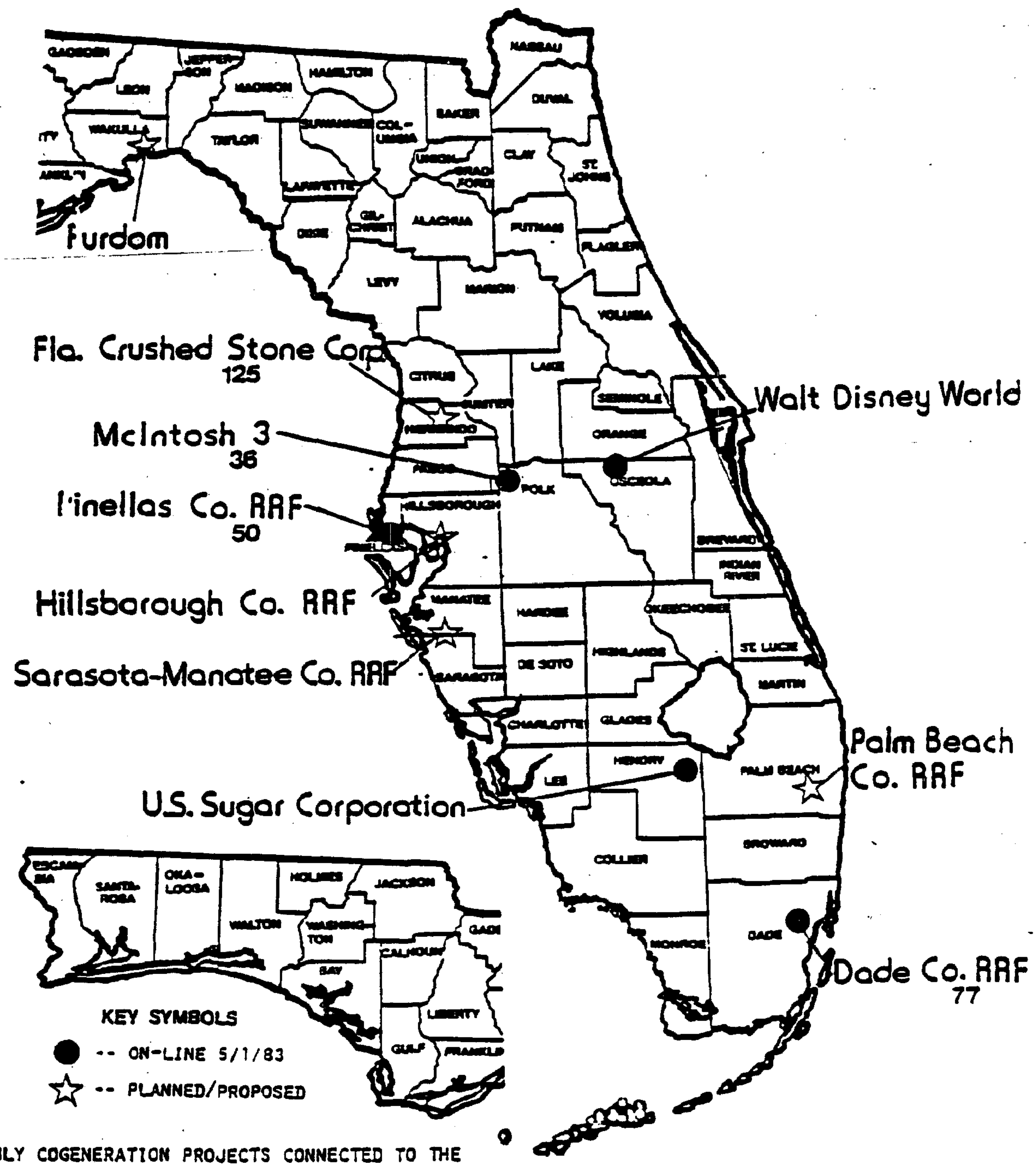


Fig. VIII-5: The Location of Resource Recovery Facilities Producing Electric Power in Florida.



NOTE: ONLY COGENERATION PROJECTS CONNECTED TO THE FLORIDA ELECTRIC POWER GRID ARE INCLUDED

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PART III

TRANSMISSION LINE SITING

CHAPTER 9

TRANSMISSION LINE SITING IN FLORIDA

CHAPTER 9

TRANSMISSION LINE SITING IN FLORIDA

Transmission line siting in Florida is governed primarily by the Transmission Line Siting Act; the provisions of this act are summarized in Part A of this chapter. This act provides for an eight-step procedure leading to certification of proposed lines by the Governor and Cabinet, as explained in Part B. Part C of this chapter reviews the responsibilities of state- and local-government agencies under the act.*

A. THE TRANSMISSION LINE SITING ACT

1. Legislative History

The Transmission Line Siting Act (TLSA) of 1980 is found in sections 403.521 - 403.536, Florida Statutes. The act, as amended in 1983, is included as Attachment III.

*Many of the provisions of the transmission line siting process are similar to those of the power plant siting process detailed in Chapter 2. This chapter has been designed to stand alone; for this reason, some of the material contained in Chapter 2 is repeated in this section.

From 1973 until the time the TLSA act went into effect in 1980, electrical transmission lines were sited under the "Developments of Regional Impact" (DRI) process, ch. 380, F.S. Eleven transmission lines, all but one of which was 230-240 kilovolts (kV), were certified through the DRI process.

Under the DRI process, the utility submitted an application for review by each local government through whose jurisdiction the line would pass. DRI reviews were frequently lengthy and time-consuming, and the process was not well suited for long lines passing through many counties. Because of these problems, the utilities pressed for an alternative state review process.

After considering various transmission line siting bills for several years, in 1980 the Legislature enacted the Transmission Line Siting Act (TLSA). Similar in nature to the Power Plant Siting Act, the new law directed the Public Service Commission to determine the need for the proposed line, and the Department of Environmental Regulation was given the authority to coordinate state review of the proposed line's social and environmental impacts. As in the PPSA, the Governor and Cabinet, sitting as the Siting Board, was given the power to award or deny the site certification. In 1983, the act was substantially amended.

2. Provisions of the Transmission Line Siting Act

This section briefly summarizes the provisions of the TLSA. Planners involved in a transmission line siting case are urged to consult the three in-depth analyses of the act and its application described in the Annotated Bibliography, Section 3 below.

Under the original wording of the Transmission Line Siting Act (TLSA) a proposed transmission line would be be subject to certification if it met the same criteria as those used in the DRI process: the proposed line would have to carry 230 kilovolts (kV) or more, and would have to cross a county line. In 1983 a third criterion for certification was added: the proposed line would have to be longer than 15 miles in length.

The certificate required by the TLSA constitutes the sole license of the state or local agencies for the location, construction, and maintenance of the project. This means that the TLSA preempts any other approval or permit. The certification is valid for the life of the transmission line, provided that construction or acquisition of the right-of-way (ROW) is begun within five years of certification.

Under the provisions of the Transmission Line Siting Act, the state certifies a transmission line "corridor" up to one mile in width, rather than the actual route of the line itself. While the corridor may be the same size as the line's ROW, generally it is much wider. Once the utility purchases rights to a relatively narrow right-of-way and begins to construct the line, the corridor in essence disappears.

An example of a proposed corridor is shown in Fig. IX-1. In this case, Florida Power and Light proposed a corridor one mile wide for its "Duval-to-Poinsett" twin 500-kV lines. The ROW as actually constructed was 300 ft. wide.*

Originally, the utility was the only body which could propose a corridor for certification. However, the concept of "alternate corridors" proposed by other parties to the certification proceedings came into being and was formally amended into the act in 1983. Under the amendment, persons who prefer a route other than the one proposed by the utility may have their proposed alternative route or routes considered for certification. Fig. IX-2 shows several alternative corridors proposed by Volusia County in the Duval-to-Poinsett case.

The certification does not give the utility a right to construct any other certifiable lines or features other than those specified in the certificate and licensed by the Siting Board (the Governor and Cabinet). The utility may build additional lines in the ROW if no certification is required for the new lines; if the new lines meet the threshold of the Transmission Line Siting Act, a new application must be filed. If the utility merely desires to widen the right-of-way, this would be considered a "modification of certification" and permission to do so would have to be obtained.

Substations or switchyards connecting the proposed transmission line to the state's electric grid are not covered by certification, and are still subject to local control. Proposed substations at locations along the route may be considered in a certification review if their placement influences the location of the corridor.

For this reason, the state does not have specific oversight over the construction of substations. However, the TLSA directs the Public Service Commission to state the "appropriate starting and ending point" of a line in its Determination of Need order. The PSC statement does not pinpoint a precise location for substations, but does indicate the general connection of the proposed line into the state electrical grid.

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*Usually, transmission line cases are referred to by the names of the two substations at either end of the proposed line. Thus the "Duval-to-Poinsett" case involved two 500-kV lines running between a substation in Duval County, known as the Duval substation, to the Poinsett substation, on Lake Poinsett, just west of Cocoa Beach.

Fig. IX-1. Preferred Transmission Corridor of the Duval-to-Poinsett Twin 500-kV Lines Proposed by Florida Power and Light Co. for an Area Due South of Palatka.

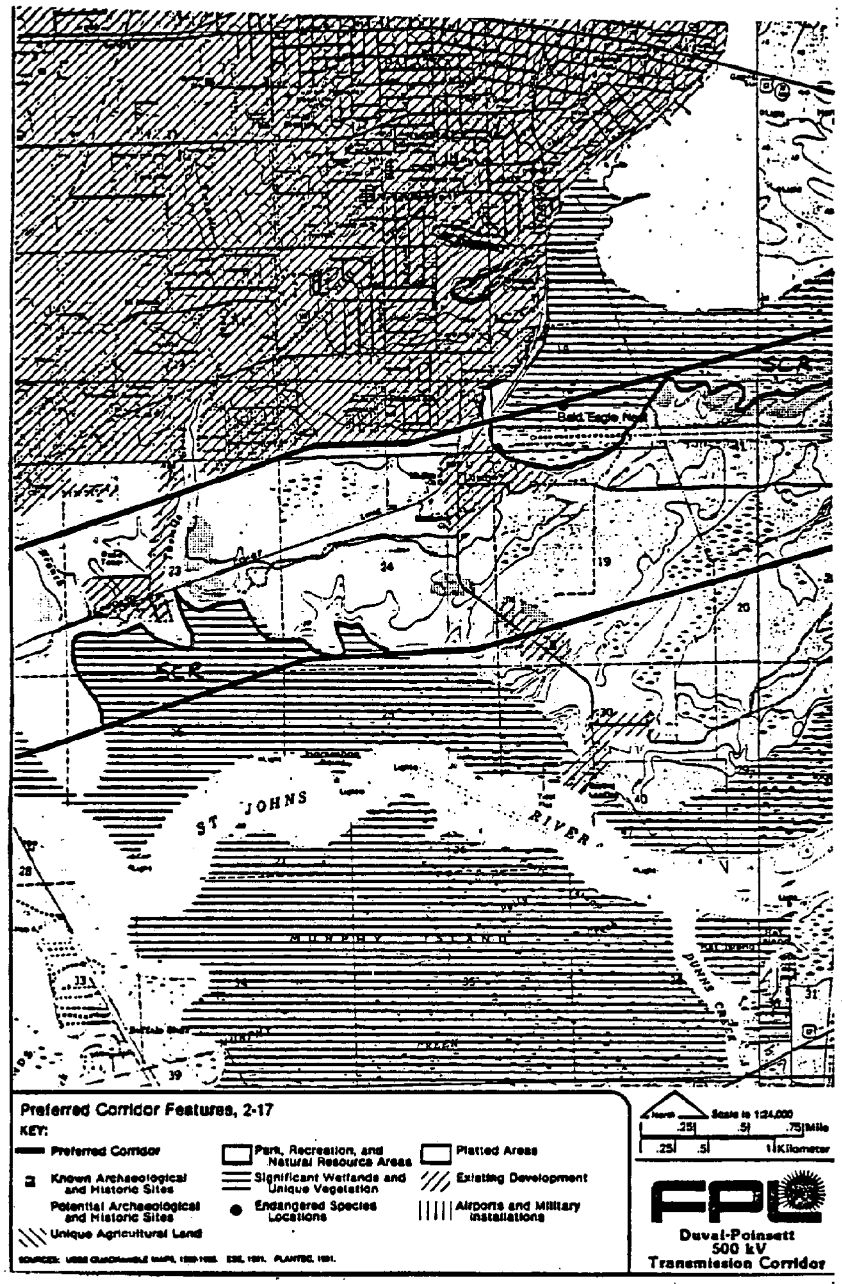
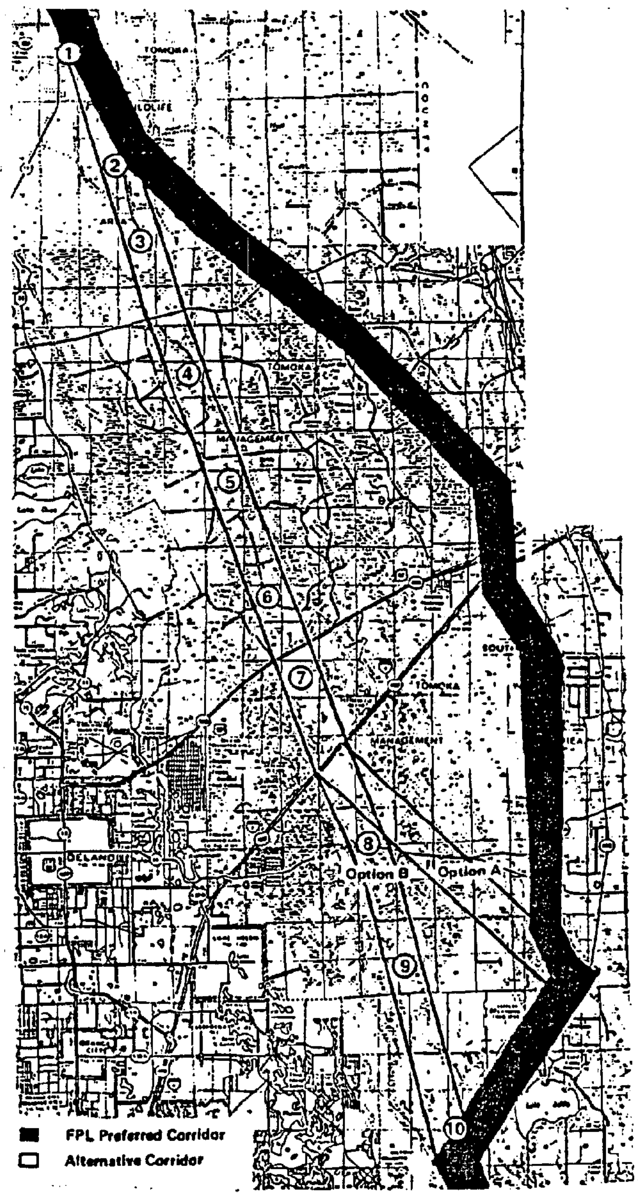


Fig. IX-2 Alternative Transmission Line Corridors Proposed by Volusia County in the Duval-to-Poinsett Twin 500-kV Transmission Line Certification Hearings.



As seen in Table IX-1, from 1981 through 1983, four applications for certification under the TLSA were received by DER. Documents relating to the applications--including the Certification Review coordinated by DER, the Recommended Order issued by DOAH and the Determination of Need order of the PSC--are listed in the Annotated Bibliography, Section 3 below. Consulting these documents could be helpful to planners reviewing a proposed certification application.

3. Other Applicable Acts

While the principal law regulating the siting of transmission lines in Florida is the Transmission Line Siting Act, there are a number of other statutes which may affect the siting process. Potentially applicable federal and state statutes are listed in Chapter 2, Part D, Power Plant Siting Regulations.

Table IX-1. Transmission Line Certification Applications Received by the Dept. of Environmental Regulation under the Transmission Line Siting Act, 1981 - 1983. (Source: DER).

STATUS
TRANSMISSION LINE SITING APPLICATIONS

Application Number	Name and Size	Counties Crossed	Utility	Application Received	(PSC) Need Determined	Environmental Hearing	Certification Date
TA81-01	Hopkins - Bainbridge 230 KV	Leon, Gadsden	City of Tallahassee	04/02/81	03/31/81	07/31/81	08/04/81
TA81-02	Central Fla. - Kathleen 500 KV	Sumter, Polk	Florida Power Corporation	06/29/81 Modified 09/21/81	07/21/81	12/10-11/81	07/26/82
TA81-03	Duval - Poinsett 2 500 KVs	Duval, Clay, Flagler, Putnam, Seminole, Orange, Volusia	Florida Power & Light Company	08/05/81	06/29/81	01/11-27/82	10/08/82 partial 11/18/82 final
TA83-04	Midway-Jensen-Crane 230 KV	St. Lucie, Martin	Florida Power & Light Company	01/10/83	12/28/82	05/23/83	01/17/84

EXPECTED APPLICATIONS

?TA84-05	Kathleen-Lake Tarpon 500 KV	Polk, Pasco, Hillsborough, Sumter, Pinellas	Florida Power Corporation	July or August '84			

9. Annotated Bibliography

TRANSMISSION LINE SITING IN FLORIDA

Hopping, Wade and Raepple, Carolyn. "A Solution to the Regulatory Maze: The Transmission Line Siting Act." FSU Law Review, Vol 8 (1980), pp. 441-461.

Wade Hopping and Carolyn Raepple are Florida attorneys who have represented electric utilities in numerous legal proceedings. This article reflects the desire of the utilities to remove the siting of transmission lines from the DRI process and summarizes the provisions of the legislation which was eventually was enacted.

Florida House of Representatives. Transmission Line Siting in Florida: An Evaluation of Ch. 80-65, Laws of Florida (Tallahassee, FL: Florida House of Representatives, Committee on Energy, Oct., 1982).

Before the amendments of 1983 were adopted, the Committee on Energy conducted a lengthy analysis of the TLSA. This report summarizes summarizes the conclusions of that study.

Minerva, Dana. Transmission Line Siting: Toward a More Rationale Decision-Making Process. (Tallahassee, FL: Florida State Univ., Dept. of Urban and Regional Planning, Master's Thesis, May, 1982).

TRANSMISSION LINE SITING: GENERAL

Moran, Mary. "Transmission Line Siting: Local Concerns Versus State Energy Interests" Urban Law Annual (Vol. 19, 1980), pp. 183 - 201.

This is a good analysis of the basic problem in transmission line siting: local interests may be intense, but since lines span numerous jurisdictions, the state must intervene to settle conflicts between jurisdictions.

TRANSMISSION LINE SITING CERTIFICATION REVIEWS

NOTE: These documents normally include the compiled agency review, the Recommended Order of the hearing officer, the Conditions of Certification of the Siting Board and the Determination of Need Order of the Public Service Commission.

Florida Dept. of Environmental Regulation, Power Plant Siting Section: Electric Transmission Line Corridor Certification Review for FPL's Duval to Poinsett Double 500 kV Circuit, Case No. TA-81-03. (Tallahassee, FL: DER, October, 1981).

Florida Dept. of Environmental Regulation, Power Plant Siting Section. Electric Transmission Line Corridor Certific. Review for the Florida Power Corp's Central Florida-to-Kathleen 500 kV Circuit, Case No. TA 81-02. (Tall.: DER. Nov., 1981).

Florida Dept. of Environmental Regulation, Power Plant Siting Section. Electric Transmission Line Corridor Certification Review for the City of Tallahassee-Hopkins-to-Bainbridge Intertie, Case No. TA 81-01. (Tallahassee, FL DER, June, 1981). 76 pp.

TYPICAL RECOMMENDED ORDERS OF THE DIVISION OF ADMINISTRATIVE HEARINGS

Fla. Div. of Admin. Hearings. In re: Florida Power and Light Co. Duval-Poinsett Transmission Corridor, Case No. 81-1938. (Tallahassee, FL: Div. of Administrative Hearings, August, 1982). 27 pp. Includes Final Order of the Governor and Cabinet of October 8, 1982, and Conditions of Certification.

Fla. Div. of Admin. Hearings. In re: City of Tallahassee Transmission Line Corridor Certification Application Case 81-1022: Findings of Fact, Conclusions of Law and Recommended Order. (Tallahassee, FL: DOAH, July 23, 1981). Attached are the Final Order of the Governor and Cabinet of Aug 17, 1981 and the DER Conditions of Certification.

TRANSMISSION LINE CERTIFICATION APPLICATIONS

Florida Power Corp. Application for Certification of a Proposed Electrical Transmission Line Corridor: Central Florida -- Kathleen 500 kV Transmission Project. (St. Petersburg, FL: Florida Power Corp., June, 1981).

Florida Power and Light Co. Application for Development Approval Lake Poinsett-Martin-Midway 500 kV Transmission Lines and Modifications to Existing 240 kV System. (Miami, FL: Florida Power and Light, n.d.).

B. THE TRANSMISSION LINE SITING PROCEDURE

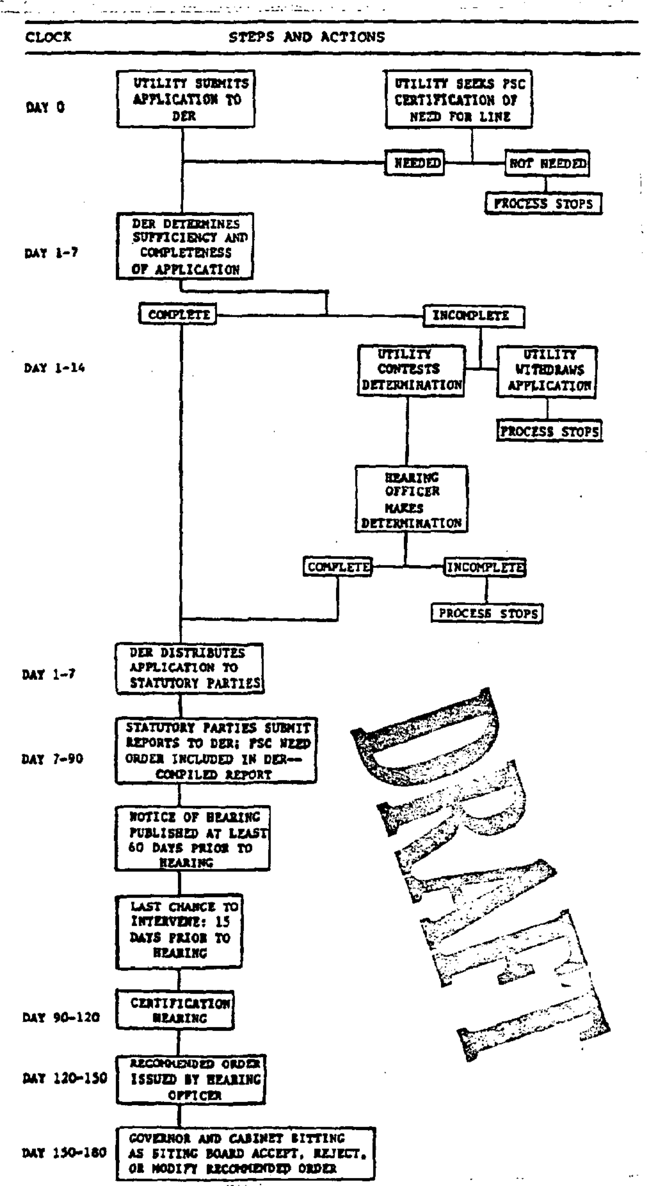
The Transmission Line Siting Act, and the rules which have been issued to implement the act, establish an eight-step procedure for certifying proposed transmission lines:

1. Pre-application Discussions
2. The PSC Determination of Need Order
3. DER Review for Sufficiency and Completeness
4. Certification Review and Studies
5. The Certification Hearing
6. The Recommended Order of DOAH
7. The Order of the Governor and Cabinet
8. Post-Certification Review by DER

As can be seen, in many ways the TLSA certification process is similar to the process of the Power Plant Siting Act process described in Chapter 2, although there are certain differences, which will be noted. Each of the steps is described below, with attention given to the points in the process when local government planners are likely to become involved.

As shown in Fig. IX-3, the TLSA and the regulations that implement it prescribe a seven-month "time clock" for processing an application. These regulations are found in Chapter 17-17, Florida Administrative Code. (Attachment IV). The times for action given below can be changed by the hearing officer, and will be somewhat different if an alternate route is considered.

Fig. IX-2. The Transmission Line Siting Process in Florida.



1. Preapplication Discussions

Pre-application discussions begin as much as one year before an application is submitted. During this time the utility may elect to file a "Plan of Study" with DER detailing the kinds of information it will submit with the application; the plan will vary from project to project, depending on the scale and location of the transmission line. Normally, the utility meets with officials of DER and other agencies to discuss the size and location of the project, as well as the methodology to be used in selecting the proposed corridor route.

2. PSC Determination of Need Proceedings

Under the Transmission Line Siting Act, the Public Service Commission must issue a "Determination of Need" order before a proposed transmission line can be approved. The PSC Determination of Need process may be conducted either before or after DER receives the certification application, but the PSC's "Determination of Need" order must be approved before the proposed line is considered by the Governor and Cabinet.

Frequently the public assumes that the key decision points in the certification process are either the review coordinated by DER or the certification hearing before the Governor and Cabinet. In actual practice, however, this has not been the case; the key decision point has been the Determination of Need order of the PSC. Whereas the review by DER focuses on environmental impacts and how they can be mitigated, the PSC Determination of Need order has, in practice, become the point in the process in which the state either approves or disapproves the proposed project.

Local government officials sometimes have not become involved in siting issues until after the PSC Need Determination order has been given; they have apparently not realized the importance of the PSC Need Determination. As a result, when they entered the siting process, the basic question of whether or not a transmission line would be constructed had essentially already been determined.

A "party" is a person or organization that has been recognized as formally taking part in the proceedings. To be granted the status of a "party," persons must prove they are substantially affected. Parties are usually represented by an attorney; however, they can represent themselves if they have sufficient knowledge of administrative procedure.

Under the TLSA, local governments through whose jurisdiction the proposed line is to pass are automatically parties to the siting case, unless they waive this right. (See sect. 403.527 of the TLSA, Attachment III.) However, because of the importance of the PSC Determination of Need order, local officials who anticipate becoming involved in a siting question may wish to contact the PSC concerning the Determination of Need proceeding, and to actively take part. Becoming a party ensures that local planners will receive all documents concerning the case, A copy of a form requesting the status of a legal "party" is included as Fig. IX-4.

3. Initial DER Review

Within seven days after a transmission line certification application is received, DER requests the Division of Administrative Hearings (DOAH) of the Florida Department of Administration to assign a "hearing officer" to preside over hearings or disputes in the case. A hearing officer is an impartial mediator who presides over all legal proceedings connected with certification of the proposed line (other than the PSC's Need Determination hearing and the hearing before the Governor and Cabinet sitting as the "Siting Board"). The TLSA specifies that the assigned hearing officer should, to the extent possible, have prior experience or training in this type of certification proceeding.

DER distributes copies of the utility's application to other state agencies, the hearing officer, local governments, libraries near the proposed transmission line, and parties in the proceedings.

Within twenty working days after receiving an application (or amendment) DER makes a determination regarding the "sufficiency" and "completeness" of the application. If DER's judgment regarding "sufficiency" or "completeness" is contested by the applicant, the hearing officer rules on the issue.

Fig. IX-4: Sample Form Requesting the Legal Status of a "Party" to a Siting Case.

BEFORE THE STATE OF FLORIDA
DIVISION OF ADMINISTRATIVE HEARINGS

In Re: FLORIDA POWER & LIGHT COMPANY - Duval to Poinsett Transmission Line Corridor,

Petitioner,

vs. Case No. 81-1938

STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL REGULATION, et al.,

Respondents.

RECEIVED
AUG 24 1981
BUREAU OF LAND & WATER MANAGEMENT

NOTICE OF INTENT TO BE A PARTY AND NOTICE OF APPEARANCE

THE STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL REGULATION hereby files notice of its intent to be a party in this proceeding and the undersigned counsel enters his appearance on behalf of the Department.

I HEREBY CERTIFY that the original and one true copy of the foregoing has been furnished by U.S. Mail to the Division of Administrative Hearings, The Oakland Building, 2009 Apalachee Parkway, Tallahassee, Florida 32301 and a true copy of the same to the persons listed below on this 21st day of August 1981:

CARLOS ALVAREZ, ESQ.
Hopping, Boyd, Green & Sams, P.A.
Post Office Box 6526
Tallahassee, Florida 32301

JOHN WILLIAMS, ESQ.
Department of Natural Resources
3300 Commonwealth Boulevard
Tallahassee, Florida 32304

LAURENCE KEESEY, ESQ.
Department of Veterans and Community Affairs
Room 530, Carlton Building
Tallahassee, Florida 32301

KEN GILLELAND, ESQ.
Game and Freshwater Fish Commission
Bryant Building
Tallahassee, Florida 32301

PAUL SEXTON, ESQ.
Public Service Commission
101 East Gaines Street
Tallahassee, Florida 32301

ROBERT CHASTAIN, ESQ.
Department of Agriculture and Consumer Services
Mayo Building
Tallahassee, Florida 32301

Louis F. Hubener
LOUIS F. HUBENER
Assistant General Counsel
2600 Blair Stone Road
Tallahassee, Florida 32301
Telephone: (904) 488-9730

4. Certification Studies

After the application is received, DER coordinates the preparation of a report called the "Certification Review" which examines a number of key issues. See the Bibliography, Section 3 of Part A of this chapter, for examples of certification studies. Among the impacts studied are the following:

Transportation--The study examines the plans of the utility to cross navigable waterways, highways, and railroads, as well as the impact the proposed line is expected to have on nearby airports. The Utility Guide published by the Florida Department of Transportation governs the crossing of highways.

Surrounding Land Uses--Using analyses prepared by the Department of Community Affairs and local governments, the report summarizes local zoning and land use ordinances, and identifies any conflicts between the plan of the utility and the local regulations.

Public Lands--The Department of Natural Resources analyzes the line's potential impact on state lands such as state parks and state forests.

Drainage and Wetlands--Both DER and Water Management Districts analyze the impact of the proposed project on drainage and wetlands. However, since the certification application is for a broad corridor, comments often must be limited to generalities; site-specific analyses must await the "post-certification review" mandated by the conditions of certification.

Plants and Animals--Based on comments of the Florida Game and Fresh Water Fish Commission, the certification review gives considerable attention to expected impacts on protected plants and animals such as the eagle and the red cockaded woodpecker. While the utility is encouraged to avoid harming "threatened or endangered" plant species, current law does not require land owners to preserve the species or their habitat. Note that even if the utility has obtained only an easement to construct the line, and does does not actually hold title to the land, it is presumed to have these "ownership" privileges.

Archeological Sites and Historic Preservation Areas--The Division of Archives, History and Records Management of the Department of State examines the proposed corridor for possible damage to sites of particular historical or archeological value needing protection. Typically, DAHRM officials review maps of the proposed corridor and then conduct an on-site investigation of areas considered potentially in need of preservation.

Water Quantity and Water Quality--Access roads for transmission lines can restrict the flow of surface water and therefore need to have properly sized culverts that allow adequate flow of surface water. Both the Department of Environmental Regulation and Water Management Districts study this issue. Culverts can block the "sheet flow" of surface water, so both the size and the direction of culverts, which needs to be parallel to the direction of sheet flow, are most important.

Construction Impacts--The Certification Review examines the construction and clearing techniques proposed by the applicant, points out the probable impacts on the environment, and recommends construction practices that will reduce damage. DER has, for example, recommended the use of moveable pads under heavy equipment to reduce the destruction of vegetation.

Maintenance of the Right-of-Way--Frequently, an item of concern in the Certification Review is the height of vegetation left in the ROW. Clearing vegetation can destroy wildlife habitat, but a cleared ROW may also serve as a firebreak. The possible adverse effects of using herbicides to maintain the right-of-way are also considered.

Potential Electromagnetic Effects -- In the amendments of 1983, DER was given the authority to set standards related to electromagnetic radiation from transmission lines proposed for certification. In the future, DER analyses will reflect this new requirement.

5. The Certification Hearing

No less than 150 days after receipt of a complete application, a public hearing is held to discuss the case. Normally, the hearing is scheduled by the hearing officer in a city near the proposed corridor. The hearing is usually held during working hours, although on occasion hearings continue on into the evening. The location for the hearing is usually a county courtroom or an auditorium. Certification hearings have taken as little as one day and as long as twenty-two days.

Although the certification hearing is held at a central location near the line, there have been instances in which citizens have had to drive up to 100 miles to attend these hearings. For this reason the Transmission Line Siting Act now provides for a portion of the certification hearing to be held in each county through which the proposed line passes, if requested by a local government in that county. The hearing officer must be requested to schedule a county hearing within 50 days after DER receives the complete application.

State regulations require the applicant utility to pay for publishing half-page notices in a local newspaper 80 days before the hearing to inform the public of the proposed transmission line. At the hearing, the utility is required to make a formal presentation on the proposed project in a way the public can readily understand. In addition, the expected environmental impacts of the project, requests for variances, the need to cross highways, and other relevant issues are discussed.

The general public is allowed to speak at the end of the proceedings. Speakers are sworn in and are asked to present new evidence or facts which have not been previously brought up by other parties. General comments which simply voice an objection to the project are discouraged. When a number of persons representing the same organization, such as a labor union or a homeowners' association, wish to make the same statement, they are asked to select a representative to present their views and to indicate how many persons are represented.

Since most private citizens will not qualify as experts in a field related to the project, testimony of the general public is taken as simply "oral communications" rather than expert opinion. Thus the weight the hearing officer will give public testimony is not as great as that afforded to an expert witness--but it is considered. Those persons or organization which have been formally recognized as "parties" to the proceedings can cross-examine a speaker and later may be allowed to challenge or rebut the information provided. For a good explanation of how a "quasi-judicial" proceeding such as this is conducted, with information on how to present testimony, see the article "Public Participation in Quasi-Judicial Administrative Hearings" by Nancy Stroud, appearing in the Sierra Club power plant siting handbook. (See the Bibliography for Chapter 2.)

Local governments may hold "informational public meetings" on a proposed power line. Such a meeting is optional, but it must be held within 80 days after the application is filed. (See sect. 403.5272 of the Transmission Line Siting Act in Attachment III.)

6. Recommended Order

Following the certification hearing, the hearing officer prepares a Recommended Order, which is then presented to the Siting Board (i.e., the Governor and Cabinet). The Recommended Order may recommend that (1) the utility be granted the certification as applied for, (2) an alternate corridor be certified, (3) the original application be modified, or (4) the application be denied. (See the Bibliography, Section 3 of Part A of this chapter for examples of Recommended Orders.)

The Recommended Order must be filed within 50 days following the completion of the transcript of the certification hearing.

7. Order of the Governor and Cabinet

In Florida, the Governor and Cabinet, sitting as the Siting Board have the final authority to certify a transmission line. In actual practice, however, the Siting Board usually adopts the recommendation of the hearing officer.

The Siting Board normally imposes "Conditions of Certification" on the applicant. Typically, these conditions give the Department of Environmental Regulation the power to review the utility's plans for the exact placement of towers and the construction of roads. Also included are a series of legal clauses relating to enforceability, severability, and the right-of-entry for inspectors. In addition, there usually is a requirement to verify that the right-of-way avoids certain prohibited areas, such as the habitat of endangered animals.

The Conditions of Certification may contain specific guidelines concerning dredge-and-fill operations, road crossings, construction in the vicinity of endangered animal species, protection of archaeological sites, compliance with the National Electric Safety Code, and revegetation of road slopes. Any variances to rules, statutes, or ordinances are also specified in the conditions. (See the Bibliography, Section 3 of Part A of this chapter for examples of Conditions of Certification imposed by the Siting Board in recent years.)

8. Post-Certification Review

The Conditions of Certification authorize DER to approve or disapprove the exact placement of the line and its towers, as well as modifications to the utility's plan that would not cause any significant environmental impact, modifications necessary to meet federal permit requirements, emergency replacement of a line, or replacement because of catastrophes. The utility must file a report on emergency replacements of towers and lines.

C. AGENCY RESPONSIBILITIES

Although the Transmission Line Siting Act assigns the Department of Environmental Regulation the lead responsibility for reviewing certification applications, a number of other state- and local-governments agencies are also directed by law and regulation to participate. These include the Department of Community Affairs (DCA), the Game and Fresh Water Fish Commission (GFC), the Department of Natural Resources (DNR), and all affected Water Management Districts (WMDs), Regional Planning Councils (RPCs) and local governments (counties and cities). The role of each of these and other reviewing agencies is detailed below.

For a directory giving the current addresses and personnel of these agencies, see Attachment IX.

1. The Department of Environmental Regulation

As lead agency in the certification process, DER in essence functions as staff to the Governor and Cabinet sitting as the Siting Board. DER is responsible for coordinating the reviews of state and local agencies, disseminating the application for certification, scheduling hearings, and providing public notices. DER compiles and summarizes the multi-agency review, called the "Certification Review."

From the reports submitted by the state- and local-government agencies, and from its own analyses, DER a recommendation as to whether or not the project should be certified. DER also makes recommendations about any variances that may be necessary and drafts the Conditions of Certification.

DER investigates the impact of the project on water and air quality, solid and chemical waste generation and disposal, as well as protection of the habitat of wildlife and the protection of other biological resources.

Once the project is certified, DER reviews the selected location of the right-of-way (in conjunction with the other agencies) to verify compliance with the Conditions of Certification. In addition, a site-specific review for any planned dredging or filling work is made. DER field inspectors monitor the construction and maintenance of the project, and initiate any necessary enforcement procedures that might be necessary.

2. The Department of Community Affairs

DCA prepares a report on the impact of the proposed transmission line project on "land use and other matters within its jurisdiction." In practice, DCA examines the proposed line to determine if it is in conformity with local zoning ordinances and local land use plans. DCA also considers the effect of the project on local and regional growth and development patterns.

3. Department of Natural Resources

In its report, the Department of Natural Resources examines the impact of the proposed transmission line project on state-owned properties such as state parks and recreation areas. DNR serves as staff to the Trustees of the Internal Improvements Trust Fund (i.e., the Governor and Cabinet), which has title to all state-owned lands other than highway rights-of-way.

If state-owned land is to be crossed by the proposed transmission line, an easement or "fee-simple transfer" must be arranged and approved by the Governor and Cabinet. "Fee simple transfer" means outright purchase of the land.

After a transmission line is certified, DNR must approve any construction activity conducted on or across state-owned lands. Until this approval has been received from DNR, DER cannot verify that the project is in compliance with conditions of certification that may have been imposed.

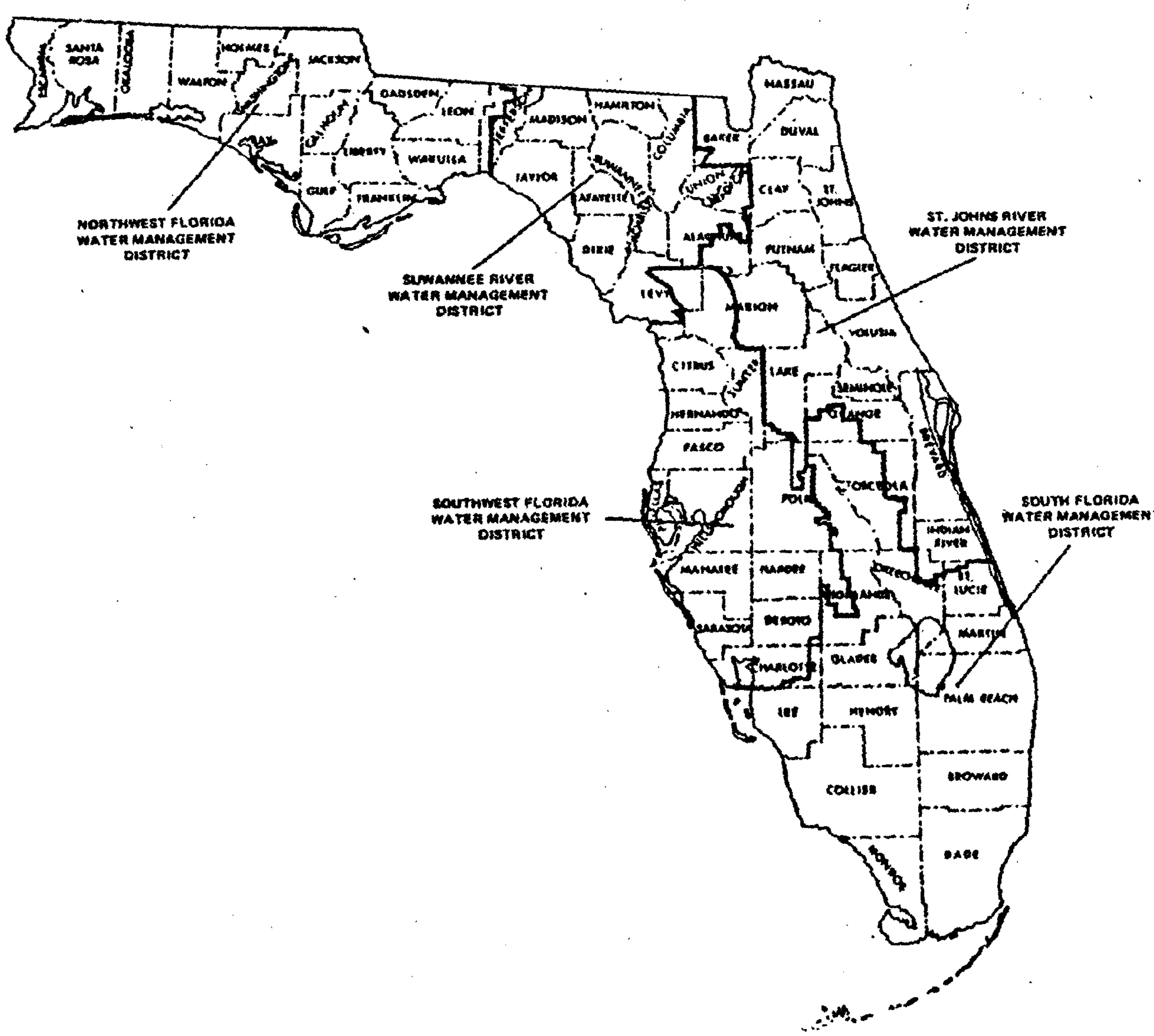
4. Water Management Districts

Each Water Management District through which the proposed transmission line passes is required to prepare a report on the impact of the project on water resources. This report normally focuses on the design and the construction of the access roads. Water Management Districts direct particular attention to the potential of the proposed roads to disrupt the flow of surface water and examine the adequacy of culverts and bridges of the line's access roads to pass storm waters. Since a wide "corridor" is certified, and not the actual line itself, a thorough analysis of the project's impact cannot be done until a specific right-of-way has been approved. (See Fig. IX-5 showing a the five Water Management Districts of Florida.)

5. Game and Freshwater Fish Commission

The report of the Game and Fish Commission addresses the impact of the proposed project on fish and wildlife resources. The impact of the line on rare or endangered species is considered, as is the impact on game species. (Note in Fig. IX-1 how the proposed line was directed around eagles nests found in the corridor.)

Fi.g IX-5: Water Management Districts of Florida.



The intent of the GFC report is to guide the utility in avoiding sensitive areas when selection of the right-of-way is made, if the corridor itself is generally found acceptable. However, if a conflict with certain species exists for the entire width of the proposed corridor, GFC may recommend that an entire area be avoided, or the corridor segment not be certified.

6. Other State Agencies

Other state agencies that frequently comment on applications for proposed transmission lines include: the Department of Transportation, the Division of Archives, History and Records Management (DAHRM) of the Department of State; and the Division of Forestry of the Department of Agriculture and Consumer Services.

a. Department of Transportation--For a transmission line to cross a state highway, the utility must first receive a permit from the Department of Transportation, which holds title to state highway rights-of-way.

b. Division of Archives, History and Records Management--The Division of Archives, History and Records Management of the Department of State reviews proposed projects for their impact on archeological and historical sites. In its review of the utility's corridor plan, DAHRM recommends avoiding certain known or potential sites; if an archeological find is located during construction, DAHRM works with the utility to investigate the site, or protect it.

c. Division of Forestry--The Division of Forestry of the Florida Department of Agriculture and Consumer Services only becomes involved in the certification of transmission lines if a State Forest is involved.

7. Local Governments

Local governments are the first avenue of assistance for their citizens. For this reason, the 1983 amendments to the Transmission Line Siting Act required the cities and counties through which the proposed line is to pass to prepare a report on its impact or to adopt by resolution the report prepared by the area's Regional Planning Council.

The local governments' reports must identify any variances from zoning ordinances or land use plans which might be necessary; if the local government objects to granting a variance, this must also be mentioned. Since certification is the only permit granted, any necessary road crossing approvals for city or county roads must be addressed.

To help ensure that local concerns are addressed in the certification process, DER encourages local governments to answer the following questions when submitting comments on a proposed transmission line project:

- Are there any special requirements for county or city road crossings which need to be included under certification? Are there any other permitting activities previously exercised over transmission lines of this scale and their access facilities which need to be addressed?

- How does the project interact with existing and future planning, zoning, and land use development for the area through which the corridor will pass? Is the alignment acceptable in comparison? Are there specific areas where the corridor or right-of-way should not be located? Why?

- Will the corridor pass over any county- or city-owned lands not identified in the application? Will there be any problems in granting an easement across identified or unidentified municipal lands?

- Are there any socio-economic factors such as the division of neighborhoods, property values, or aesthetics, which should be addressed in the certification process? What about conflicts with local support services, such as radio interference with emergency vehicles or broadcast towers?

- Are there environmental or special use factors which the county or city is particularly concerned about, such as proximity to landfills or unregistered airplane landing fields?

The TLSA has been amended to encourage public meetings to inform citizens about a proposed transmission line project. The act suggests that a public meeting be held early enough to allow the local government to propose an alternative corridor, if this is needed.

Local governments are required under the TLSA to prepare preliminary reports in time for public meetings, well before the certification hearing. This helps determine if alternative corridors are necessary, points out problems with state agency reports, helps state agencies prepare their final reports.

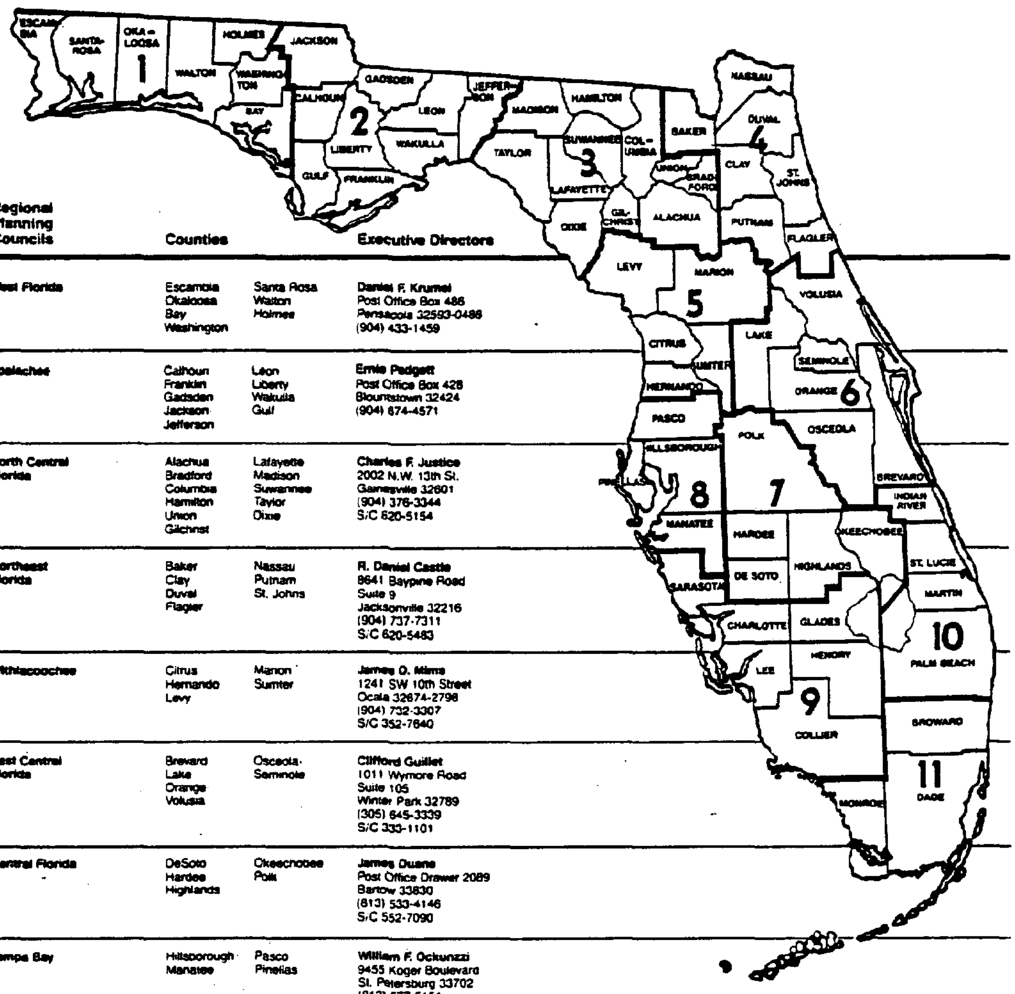
8. Regional Planning Councils

The TLSA now requires each affected Regional Planning Council to comment on matters within its jurisdiction. The areas that RPCs comment on include the relationship of the proposed line to comprehensive plans in the region and conflicting issues between and among local governments. RPCs are expected to provide assistance to local governments in reviewing a proposed transmission line. (See Fig. IX-6 for a map showing the Regional Planning Council districts of Florida.)

9. Federal Agencies

Strictly speaking, federal agencies are not a formal part of Florida's Transmission Line Siting Act. However, a number of federal agencies are routinely involved in transmission line siting in all states. Among these federal agencies are the Army Corps of Engineers, the Fish and Wildlife Service, and the Federal Aviation Administration:

Fig. IX-6: Regional Planning Council Districts of Florida.



Planning Districts	Regional Planning Councils	Counties		Executive Directors
1	West Florida	Escambia Okaloosa Bay Washington	Santa Rosa Walton Holmes	Daniel F. Krumel Post Office Box 486 Pensacola 32593-0486 (904) 433-1459
2	Apalachee	Calhoun Franklin Gadsden Jackson Jefferson	Leon Liberty Wakulla Gulf	Ernie Padgett Post Office Box 428 Blountstown 32424 (904) 674-4571
3	North Central Florida	Alachua Bradford Columbia Hamilton Union Gilchrist	Lafayette Madison Suwannee Taylor Dixie	Charles F. Justice 2002 N.W. 13th St. Gainesville 32601 (904) 376-3344 S/C 620-5154
4	Northeast Florida	Baker Clay Duval Flagler	Nassau Putnam St. Johns	R. Daniel Castle 8641 Baypine Road Suite 9 Jacksonville 32216 (904) 737-7311 S/C 620-5483
5	Withlacoochee	Citrus Hernando Levy	Marion Sumter	James O. Mims 1241 SW 10th Street Ocala 32674-2798 (904) 732-3307 S/C 352-7640
6	East Central Florida	Brevard Lake Orange Volusia	Osceola Seminole	Clifford Guillet 1011 Wymore Road Suite 105 Winter Park 32789 (305) 645-3339 S/C 333-1101
7	Central Florida	DeSoto Hardee Highlands	Okeechobee Polk	James Duane Post Office Drawer 2089 Bartow 33830 (813) 533-4146 S/C 552-7090
8	Tampa Bay	Hillsborough Manatee	Pasco Pinellas	William F. Ockunzzi 9455 Koger Boulevard St. Petersburg 33702 (813) 577-5151 S/C 586-3217
9	Southwest Florida	Charlotte Collier Glades	Hendry Lee Sarasota	Wayne E. Daltry 2121 West First Street Ft. Myers 33901 (813) 334-7382 S/C 552-7290
10	Treasure Coast	Indian River Martin	Palm Beach St. Lucie	Sam Shannon Post Office Box 396 Stuart 33495-0396 (305) 286-3313 S/C 451-5150
11	South Florida	Broward Dade	Monroe	Barry Peterson 3440 Hollywood Blvd. Suite 140 Hollywood 33021 (305) 961-2999 (Dade) (305) 620-4266 (Broward)

Department of Community Affairs
Office of the Secretary
(904) 488-8466
May 1984

a. <u>Army Corps of Engineers</u>--The Army Corps of Engineers (COE) reviews the proposed line for its impacts on waters of the United States if dredging or filling is planned for the project. Normally the COE comments only on the site-specific information such as the exact placement of towers and water crossings. Because federal agencies are not bound by a state permit, it is conceivable that the Corps could deny permitting a portion of the project within a corridor certified by the state.

b. <u>Fish and Wildlife Service</u>--The Fish and Wildlife Service (FWS) of the U. S. Department of Interior frequently comments on the potential for impact to endangered or threatened species and may be called in under any federal permitting activities for a consultation pursuant to Section 7 of the Endangered Species Act. If a federally-listed species may be adversely impacted by the project, this may be cause to withhold the federal permit. The comments of Florida's Game and Fish Commission are used in the analysis conducted by FWS.

c. <u>Federal Aviation Administration</u>--Comments are solicited from the Federal Aviation Administration of the U. S. Department of Transportation whenever a proposed line is located near an airport.

d. <u>Federally-Owned Lands</u>--If the project will cross federally owned lands such as a National Park or a National Forest, the utility must make ownership arrangements or obtain easements. If the land management agency objects, this may force the utility to reroute the corridor. Normally, however, the utility makes these arrangements before an application is submitted.

CHAPTER 10

IMPACTS OF TRANSMISSION LINES

CHAPTER 10

IMPACTS OF TRANSMISSION LINES

The impacts of transmission lines can be classified in two major categories: (1) operational impacts, such as electromagnetic radiation, noise, and ozone production; and (2) construction and land use impacts, such as impacts on water quality, vegetation, wildlife and and property values. In this chapter, an overview of transmission lines in Florida is provided in Part A. Operational impacts are examined in Part B; construction and land use impacts are discussed in Part C.

A. TRANSMISSION LINES IN FLORIDA

1. Description and Engineering Characteristics

The need to transport electrical energy efficiently and economically from one location to another in increasing amounts has led to continual development of higher and higher transmission voltages. Virtually all long-distance transmission in Florida is by means of alternating current (ac), either 230 kilovolts (kV) or, for longer distances, 500 kV ac as primary transmission levels.

Lines rated at 765 kilovolt systems are in use in some locations in the country, and pilot 1200 kV systems have been developed. A few direct current (dc) systems are also in use, and the trend may be to shift to more dc systems for long distance transport. None, however, is being discussed for Florida at the present time.

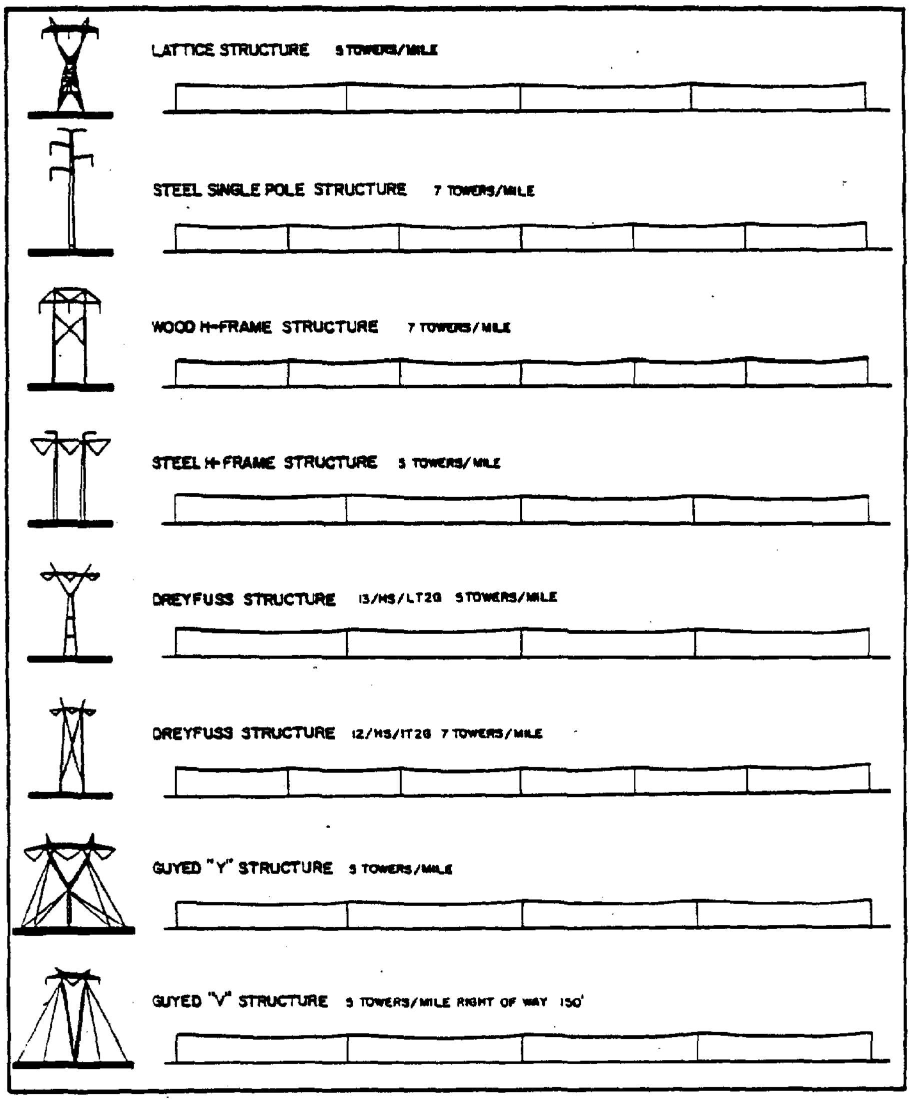
Certain design features are used in all high voltage transmission lines for electrical and structural engineering reasons. Three wires are used per percuit because power phases coming from turbine generators come in three alternating pulses; three wires are used, and each wire carries a third of the overall flow.

Conductor wires typically are made of aluminum with steel reinforcements; hence the ACSR (Aluminum Conductor, Steel Reinforcements) rating often given when describing the circuitry. The conductor wires are suspended on disk insulators made of special materials. A ground wire and a lightning shield wire are also a part of a complete circuit.

Fig. X-1 shows typical towers configurations. Although towers vary from company to company and with the terrain, in Florida typical 500 kV towers are four-legged steel lattice-work structures, guyed lattice-work steel "V's", or tubular steel towers resembling a "pi" symbol. Angle structures use a stronger variation of the tangent (straight-line) structure. The 230 KV systems typically use wooden "H" structures or concrete mono-poles.

Span lengths used are related to the conductor gauge, the tower design, the terrain, and any right-of-way (ROW) width limitations. The large 500 KV circuits average 1000-1300 foot spans, while wooden H-frames for 230 kV lines typically have 600-foot spans. However, in uneven terrain, these heights and spans will be adjusted on a tower-by-tower basis so that at least a specific ground clearance is achieved under adverse operating conditions (e.g. overheating or ice-buildup). Clearances are calculated according to standards outlined in the National Electric Safety Code.

Fig. X-1: High-Voltage Transmission Line Towers.



In other instances, the necessity to span a physiographic feature such as a river may mandate use of special towers; for 500 KV circuits such towers allow spans up to 1800 feet or more but are quite costly. When ROW widths are a limiting factor such as in densely developed residential areas, tall towers or short spans may be used to hold up line sag within a safety clearance zone.

Widths of the right-of-way can vary quite widely, from as narrow as 35 feet for a single 230-kV line, to several hundred feet for multiple circuit routes. Design must ensure that structures or vegetation will not interfere with the swing of the conductors or knock down lines, if, for example, a tree should fall over. Also tower and line maintenance must not be hindered.

Transmission lines are rated in terms of megavolt-amperes (MVA), a concept closely related to megawattage. For example, a 240 MVA line will transport around 240 megawatts (MW) of power. The line can carry more power than that, but may overload, becoming hot and stretching closer to the ground than safety limits prescribe. This may also cause damage to the circuits.

Lines are also described in terms of the voltage they can carry, a geometrically rather than linearly related function of power (wattage). For example 138 KV line can carry about 200 megawatts of power; a 240 KV line, 600-700 MW; and a 500 KV line, 2500-3000 MW. Line losses caused by radiation or energy and by friction decrease with the use of larger lines; therefore the trend is to use increasingly larger conductors for bulk power movement.

Transmission circuits are interconnected at substations, switchyards, or power plant bus-bars. Substations contain banks of transformers where power levels are changed via current induction to the appropriate voltage for the distribution system. Switchyards simply route the current to the various regional lines, while bus-bard introduce generated power from the turbines into the electric grid.

2. High-Voltage Transmission Lines in Florida

Fig. X-2 provides a map of 500 kV lines in the state. Notice that in an effort to improve reliability of the Florida electric grid and to import power from Georgia, twin 500 kV lines are being constructed parallel to the eastern shore of the Florida peninsula. When completed in 1985, these twin lines will run from the Jacksonville area, past Daytona Beach, and on to the Gold Coast, just west of Palm Beach, Ft. Lauderdale and Miami.

In addition to the twin 500 kV lines in the east, the Public Service Commission and the utilities are currently exploring the feasibility of constructing a second 500 kV tie into Georgia. Paralleling the twin lines of the east, this second line would cross the Suwannee River, and run east of the the population centers of Tampa and St.Petersburg on Tampa Bay, and into southwest Florida east of Sarasota and Ft. Meyers. At the time of this writing, the western link has not been certified and it is uncertain what future this proposal may have.

A map showing the smaller 230 kV lines in the state is published each year in the Ten-Year Plan published by the FCG and is not reproduced here.

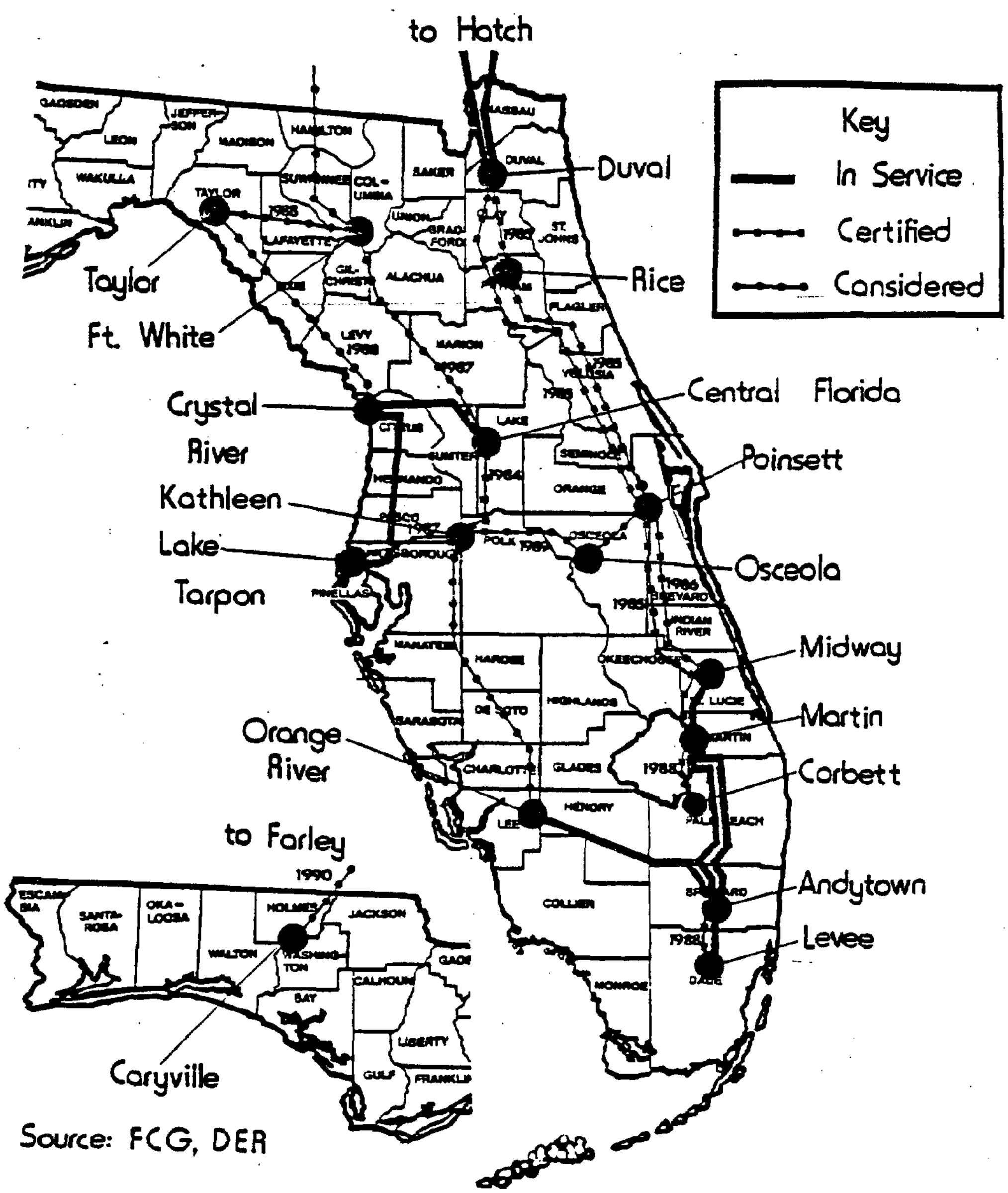
The advantage of using high voltage lines in bulk power distribution has become a major issue in power plant siting cases in Florida because of the availability of nuclear and coal-based electricity in Georgia. Although up to 4500 MW of power could be available from Georgia, the electric utilities of Florida are currently committed to purchase of only about the following amounts:

Year	Amount	Year	Amount
1984	950	1989	2,400
1985	2,000	1990	2,400
1986	2,000	1991	2,400
1987	2,500	1996	0
1988	2,400	2001	0

Other advantages include energy interchanges between and among systems to utilize cheaper base-load, rather than using more expensive mid-range or peaking units. Another advantage is the sharing of operating reserves so that an individual utility does not need to construct extensive (and expensive) back-up facilities. And, finally, interconnections improve system reliability by providing alternate pathways for power flow.

To benefit from these advantages the Florida Electric Grid has been formed to tie together the utilities of the state. However, a study by the U. S. Dept. of Energy showed Florida electric power supply to be among the most unreliable in the nation, stemming, in part, because of the state's geographical isolation from other power networks.

Fig. X-2: 500 kV Power Lines in Florida.



B. OPERATIONAL IMPACTS

In recent years, as utilities have applied for permission to construct transmission lines of higher and higher voltages, the public has become increasingly interested in the potential for health-related effects of power transmission. As a result, a number of studies of this issue have been conducted.

This section provides a brief review of the conclusions of studies carried out in four state and by the Electric Power Research Institute. However, this is not an in-depth examination of the subject, and any planner becoming involved in this question is encouraged to consult the Bibliography provided below in Section 4.

1. Electric Transmission Line Fields

Long-distance transmission of electric power is normally accomplished using Extra-High Voltage transmission lines--i.e., those above 345 kV (kilovolts). Although voltages as high as 765 kV have been used in some states, and high voltage direct current (HVDC) lines have also been used in some area, there are no plans in Florida to use either HVDC lines or any voltage above 500 kV. Consequently, this section deals almost exclusively with the possible impacts of 500 kV AC power transmission at 60 hertz (i.e., 60 cycles per second).

The strength of an electrical field surrounding a power line, measured in "kilovolts per meter" (kV/m), decreases with the distance away from the centerline of the transmission line. As shown in Fig. X-3, the peak voltage of a 500 kV line is about 8 kV/m at a distance of 50 feet from the centerline, and decreases to a level of less than 0.1 kV/m 300 feet from the centerline. The density of a field is measured in units called the "Gauss;" normal field densities are 1-2 Gauss.

The current "induced" in a person or object near the line is measured in milliamperes (mA). As seen in Fig. X-4 the peak current induced in an automobile at a distance of 20 meters (about 65 feet) from the centerline is approximately 0.12 mA. This is an extremely small current, well below the threshold for human perception, which begins at 0.5 mA. Still, this current is large enough to produce a spark at times, and some utilities warn residents that automobiles or mobile equipment such as a tractor should not be refueled under an EHV power-line. This level of current is far below the "release" current--the current at which an individual may be unable to let go of a wire. (See Fig. X-4).

The current level in the vicinity of a power line can be compared with current and voltages from other sources. As seen in Table X-1, a portable household appliance exposes the operator to a field of 33 kV/m and a current of 500 uA (i.e., .5 mA). An electric blanket is rated at 0.5 to 1.7 kV/m and from 7-25 uA.

Fig. X-3: Electric Field Profile for 500 kV Horizontal Configuration with Three Sub-Conductors. Source: Maryland PPCUEIP (1978).

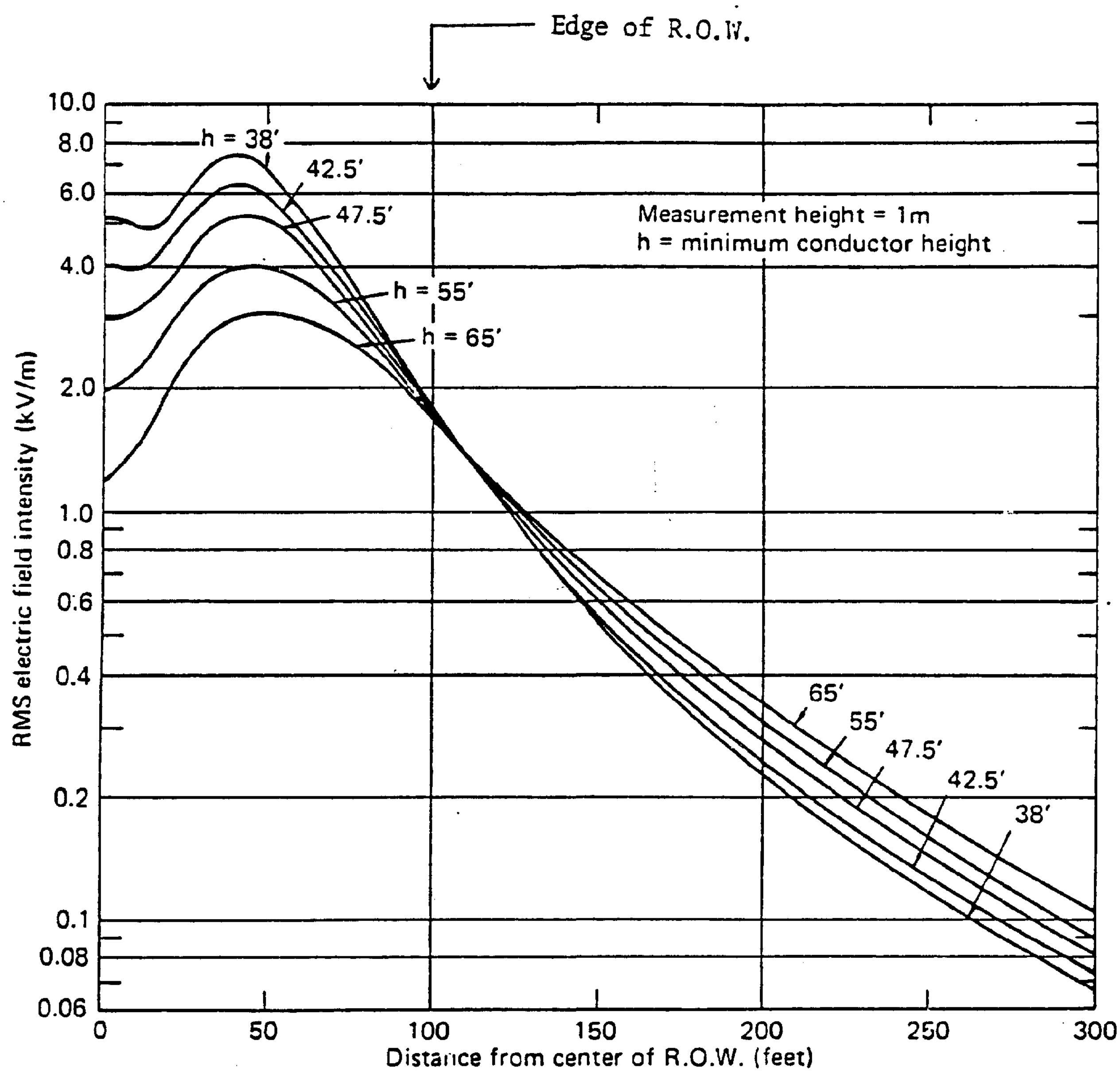


Fig. X-4: Observed Current Under an EHV Power Line and Thresholds of Perception.
Source: EPRI (1982).

IMPORTANT THRESHOLDS

• CURRENT (mA)

0.5-2.0	PERCEPTION
1.5	STARTLE REACTION
2.0	"OBJECTIONABLE"
	RELEASE CURRENTS
5	SUSPECTED FOR CHILD
10.5	AVERAGE FOR ADULT FEMALES
16	AVERAGE FOR ADULT MALES
18-22	RESPIRATORY PARALYSIS
50-100	VENTRICULAR FIBRILLATION

• REACTION OF CHILDREN IMPORTANT

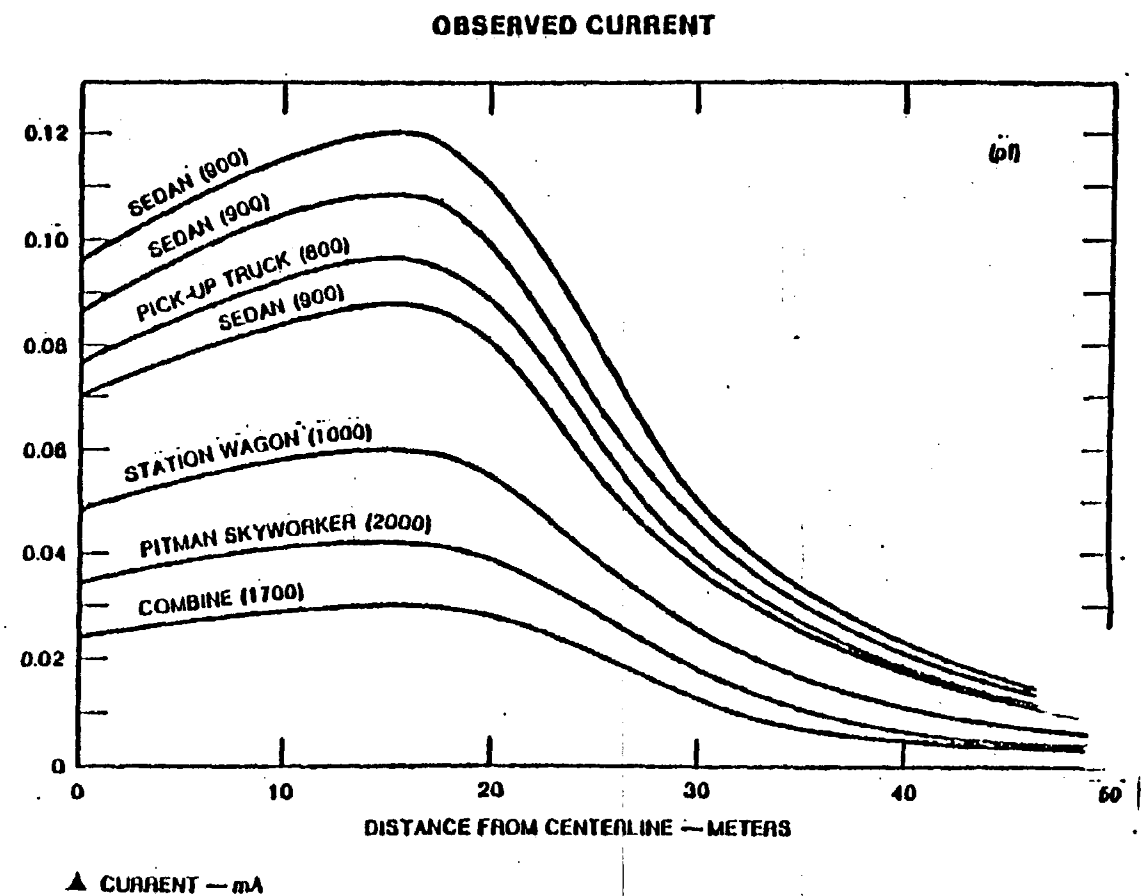


Table X-1: Comparison of Body Current and Related Current Densities in Terms of Equivalent Electric Fields. Source: EPRI (1979).

	I	II	III
	Current µA	µA/cm²	Equivalent or actual electric field exposure kV/m
Electric Anesthesia (100 Hz Square-Wave)	10,000	>1,000 (1)	670
Pacemaker Output Electrode	6,000 (4)	20,000 (4)	400
Fixed Household Appliance	750	18 (2)	40
Portable Household Appliance	500	12 (2)	33
Man in 8 kV/m Field	120	3 (2)	8
Man in 4 kV/m Field	60	1.5 (2)	4
Electric Blanket	7-25	2-40 (3)	0.5 to 1.7
Man in 0.15 kV/m Field	2.2	0.05 (2)	0.150

(1) Next to electrode
(2) Passing through 40 cm² ankle
(3) ¼" from electric wire in blanket
(4) Peak pulse current (2 ms pulse every 0.8 second)

The magnitude of the electric fields near a power line small, but even this level of current can induce charges on metallic surfaces such as vehicles, gutters on adjacent structures, fences, and masts of sailboats. People touching these objects may draw a steady current through their body or may be startled by a spark discharge when approaching these objects. The magnitude of the electric field varies with location, conductor height, and the configuration of the line.

2. Biological Effects

Thousands of studies have been conducted to study the biological effects of electric fields. It is evident from this research that electrical fields do have effects which can be demonstrated, but the possible impact on human health is not clear.

The results of four studies reviewing the research on this subject are presented below. These studies were prepared by the states of Minnesota Maryland and Montana, and by the Electric Power Research Institute (EPRI).

Although direct health effects of transmission lines are not clearly established, some states have set limits on the strength of fields permitted. Oregon has adopted a maximum field strength of 9 kV/m, and Minnesota has adopted a standard of 8 kV/m. New York has effectively limited field strengths to 1.6 kV/m at the edge of the right-of-way, and a Montana study recommended a maximum of 1 kV/m at the ROW edge. To date, Florida has not adopted such a standard.

a. Minnesota Study -- A 1980 study conducted by Dow Associates for the Minnesota Environmental Quality Board highlighted a number of studies which showed biological effects of transmission line fields. Among the effects the study called attention to were the following:

Cell Growth and Division--Altered amoeba shape and motility near a 1kV/m source

Plants--Leaf tip damage and threshold for many plant species at 20-25 kV/m, perhaps down to 10 kV/m for plants taller than 15 cm.

Blood Chemistry--Increased levels of "serum triglycerides" in female monkeys at 0.02 kV/m and 2 Gauss. (Triglycerides are fatty substances in blood which, in increased amounts, are associated with plaque and heart attacks.)

Circadian Rhythms--Altered circadian period in humans due to 0.0025 kV/m, 10 Hz field, dependent on frequency (Circadian rhythms refers to daily biological cycles).

Mammalian Neurophysiology and Behavior--Increased neuronal excitability in rats at 100 kV/m

Epidemiology--Contradictory reports of links between childhood leukemia and 60 Hz-fields

b. EPRI Research Review --A 1979 review of research on electrical fields conducted by IIT Research for EPRI, the research organization of the electric utility industry, came to the following conclusions, summarized here:

Genetics--ELF [Extremely Low Frequency] radiation [ie. 30 - 300 Hz] as normally experienced was found to be incapable of producing genetic effects. . . . Available evidence suggests that no genetic effects will occur in the powerline environment.

Reproduction, Growth and Development--Fertility growth and development would not be adversely affected by either the electric or magnetic field environment.

Nervous System and Behavior--No behavioral, neurophysiological, or neurological effects can be expected to occur.

Cardiovascular Functioning--Present evidence is insufficient to conclude that field strengths within the ELF range result in hazardous changes in cardiovascular function. However, neither does the evidence allow the conclusion that these functions are not disturbed by ELF field exposures.

Hematology and Blood Biochemistry--Available data on hematological and blood biochemical parameters are not sufficiently convincing to conclude that ELF field exposures evoke a stress response or other significant biological changes in animals or man.

Triglycerides--An early preliminary study conducted on a very small number of human subjects exposed to magnetic fields in the order of 1 Gauss at 45 Hz produced results which caused concern that the exposure to magnetic fields could increase triglyceride levels in humans. However, the review of seven subsequent studies establishes the absence of such an effect.

c. Montana Study--After an extensive review of the literature on transmission line effects, the state of Montana concluded:

> Research in laboratory animals and the few studies of humans leads to the conclusion that pathological effects in human beings exposed to 60 Hz electric fields at any field strength are unproven and speculative. Similarly, subtle effects on the nervous system that may alter mental state, disrupt normal body rhythms, alter libido, increase the frequency or severity of headaches, or lead to effects of digestion or other functions influenced by the central nervous system, are not demonstrated by the scientific research to date. The existing data do not permit the prediction that effects such as those just listed would occur as the result of chronic exposure to electric fields.
>
> The field effects that have been demonstrated in several animal studies suggest it is reasonable to expect that humans exposed to appropriately scaled electric fields may

> show physiological or behavioral alterations related to those observed in animals. The pathological or behavioral alterations cannot be foreseen.
>
> Negative impacts on human health have not been established by the few studies of humans. These however are limited in scope and are often methodologically flawed. They do not form the basis for a conclusion that chronic exposure to 60 Hz electric fields at arbitrary field strength is without effect for the general population." (See <u>Biological Effects of High Voltage Transmission Lines</u> in the Bibliography below.)

Based on these conclusions, the Montana study recommended a limit of 1 kV/m at the edge of the transmission line right-of-way. The study indicated that little additional cost to a utility would be required for meeting this regulatory standard for a 500 kV line.

The 1kV/m limit was recommended because most laboratory studies suggesting possible chronic effects for subjects having continual exposure (such as those living or working adjacent to a transmission line) involved electric fields in excess of 1 kV/m.

d. <u>Maryland Studies</u>--A 1979 report by Dr. Randy Roig, an official of the Maryland Power Plant Siting Program, concluded:

> Effects on humans depend on the distance to the transmission line and the size and orientation of the object causing the effect. The magnitude of these effects has been modeled assuming a typical 500-kV power line configuration. In field tests, actual observed effects have varied from 10 to 100 percent of the calculated 'worst-case' results, reflecting the fact that many unknown and uncontrollable factors (such as insulation and moisture content, and capacitance of irregular objects) are of central significance. . .

Questions have been raised concerning the long-range health effects of chronic exposure to oscillating electric fields at magnitudes found within (or possibly adjacent to) transmission line rights-of-way. Soviet literature contains reports of medical evaluation of personnel working in 400-kV to 765-kV switchyards. A majority of those studied developed pathological reactions attributed to their exposure to the electric fields. As a result, Soviet work regulations limit the time a worker may be exposed to fields equal to or in excess of 5 kV/m. . . to 3 hours per day. In contrast to the Russian reports, a major U. S. medical study of 10 linemen, who worked with 138-kV and 345-kV equipment over a 9-year period, concluded that the health of these men had not been affected by their exposure to the high-voltage lines. . .

At the present time, safe limits for exposure to electric fields from transmission lines have not been established in the U.S. Several factors should be appreciated in evaluations of available literature on transmission line health effects: Neither Soviet nor U.S. reports on health of linemen and switchyard workers present adequate test data or discuss control procedures. Linemen and switchyard workers may be exposed to higher fields (up to 25 kV/m) than would be experienced by other people under the transmission lines.

e. Other Studies--The Bibliography, Section 4, lists additional studies which planners may wish to consult. Of particular interest are the studied being conducted by the New York State Overhead Power Project, a project in which research has demonstrated that exposure of human cells to abnormally high voltage levels can cause increased rate of cancer cell production. Also, the testimony of Dr. Andrew Marino, testifying in a recent 500 kV transmission line siting case, and the testimony of Dr. Edwin Carstenson in a 240-kV case, are useful.

3. Other Effects of Transmission Lines

Corona discharge from high voltage transmission lines can cause television and radio transmission, audible noise, and the production of ozone. The term "corona" refers to an electrical discharge produced when the electric field intensity at a conductor surface exceeds the electric breakdown potential of the surrounding air.

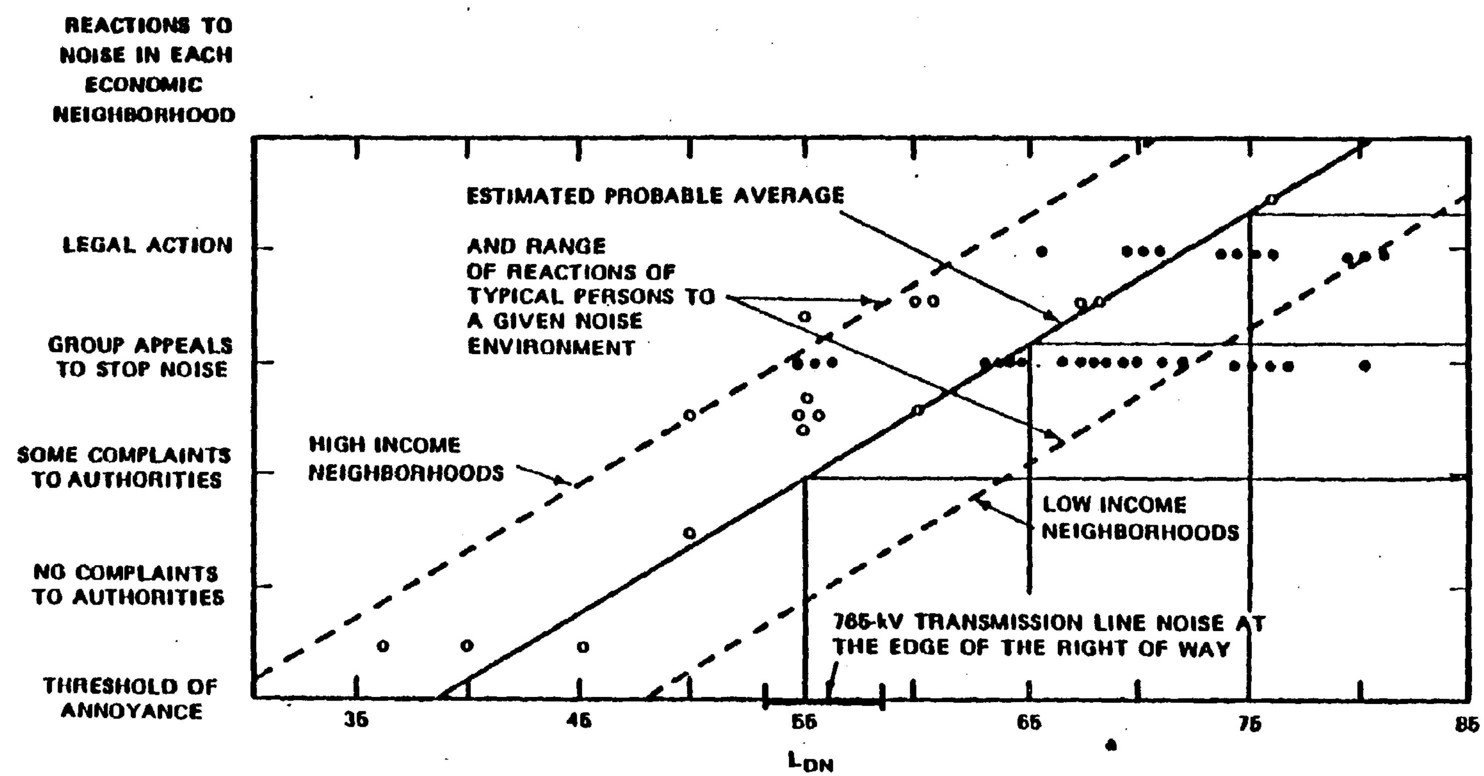
In a corona, an avalanche of electrons collides with molecules of air, causing energy to be released in the form of visible light, electromagnetic energy, and audible noise. This means that the effects of corona discharges can be heard, can produce radio and television interference, and can glow at night. Corona discharge usually occurs where there are irregularities on the conductor, such as nicks, scratches, insects, and water drops, and is usually most noticeable in wet weather.

a. Noise--Audible noise due to corona discharge consists of a "sizzling" sound in wet weather and a barely audible crackling noise in dry weather. In one study, noise from a 500-kV double circuit line in wet weather reached a level of 43 dBA near the transmission line right-of-way (ROW), and 30 dBA at a distance of 20 feet from the ROW, the level of background noise in a very quiet rural area at night.

As seen in Fig. X-5, at this noise level, the possibility of annoyance cannot be ruled out. Ambient noise levels (i.e., those found in nature) may be exceeded at high frequencies (above 50 Hz); fortunately, the higher frequencies characteristic of transmission line noise are more rapidly attenuated with distance.

b. TV and Radio Interference--Radio interference caused by corona discharge is evident, especially in rainy weather in AM reception near the power line. It is usually negligible for FM and TV reception.

Fig. X-5: Reactions of People in Different Income Neighborhoods to Environmental Noise. Note that at the edge of the ROW for a 500 kV line, the noise level can reach 43 dBA. Source: EPRI (1982).



Source: Kryter, 1970

During fair weather, residents near a right-of-way experience minimal interference. Investigations for one proposed 500-kV line indicated that at least 18 AM radio stations would maintain an acceptable signal-to-noise ratio (21 dB) along the transmission line corridor. During light rain or dense fog, however, residents extremely close (less than 100 feet) from the right-of-way might notice some degradation in signal quality, although the signals of 5 to 10 AM stations could still be received. During heavy rain (a condition that often brings its own radio interference), interference extends to greater distances; in that study, residents located closer than 100 feet from the right-of-way would be able to receive only 2 to 7 stations.

c. Ozone--Corona discharge from high-voltage transmission lines, especially during period of heavy rain, produces ozone by a method analogous to that occurring during lightning discharges. Although the ozone can be detected in a laboratory, field studies have either failed to detect ozone produced by transmission lines or have, under worst-case conditions, found an average of less than one part-ber-billion (ppb) above peak background fluctuation. From this research, it is reasonable to conclude that ozone production from transmission lines would not have any significant effect on the local or regional environment.

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B. CONSTRUCTION AND LAND USE IMPACTS

During the construction of a major power line, there are likely to be impacts of some degree on water quality, water quantity, vegetation and wildlife. In addition, once the line is in place, there may be increased public access to a once isolated area, and there may be impacts on property values near the line. Each of these impacts is discussed in this section.

1. Construction Impacts

Construction involves clearing the right-of-way (ROW) for the line, constructing access roads, erecting the towers and stringing the conductors and shield wires. The main environmental impact expected during construction (or during a period of extensive maintenance) is on water quality. Using heavy construction equipment to place towers in rivers, dredging for culverts, dumping fill for access road foundations in wetlands, and clearing trees and other vegetation can cause or increase soil erosion and turbidity of adjacent waters.

One of the chief causes of water quality problems that may arise from the construction of transmission lines comes from the placement of access roads along the transmis-sion corridor. Access roads are needed for maintenance work on the transmission lines . Access to lines in upland areas typically requires only some clearing and usually has negligible impact on water quality. But in wetlands or aquatic areas, access roads must be constructed to support heavy equipment in wet conditions.

Access roads in wetlands, if constructed across the direction of water flow or sheet flow of surface water can block the "sheetflow" of surface water. This can result in damming the water on one side of the road, thereby increasing the possibility of the road washing out (called a "blow out"). On the other side of the road, the land can dry out, leaving it more susceptible to fire, halting water recharge, and altering the habitat of wildlife.

To reduce this problem, numerous culverts can be installed beneath the road; however, this may not be adequate in open water areas where towers stand on fill "islands." Access in that case must be on foot, or by boat or helicopter. Planners, such as those in Water Management Districts, must give close attention to a planned road to ensure that its placement will avoid problems to the extent possible, and that its culverts are large enough to ensure that water flow is not obstructed.

Towers are usually placed in rivers by using barges. Steel tubes are driven into the river bottom, then filled with an "anchor cage" and concrete; some turbidity may occur during when the tubes are driven into the sediments.

Construction-related water quality impacts can be reduced by several means. First, the route of the proposed line can be laid out to avoid as many sensitive areas as possible. The use of "vegetational buffers" to screen water runoff before it enters creeks and streams can also help. Using turbidity screens and erosion controls such as hay bales and mulching also reduces siltation problems. Manually clearing vegetation near water bodies manually reduces the need for large clearing equipment. In some instances, leaving the trees where they fall can mitigate damage caused by hauling trees off, although removing the cut trees can prevent log jams downstream. Using moveable pads for heavy equipment can reduce damage to vegetation.

2. Impacts from Increased Access

Access roads needed for the construction and maintenance of transmission lines can also provide access for persons other than utility workers. Transmission line access roads can open previously remote areas to hunters, motorists, sight-seers, and indiscriminate trash dumpers. This can disturb wildlife and increase the risk of forest fires; however, access roads can be beneficial in that they serve as fire breaks. Use of an access road is controlled by both the utility and the property owner, and the utility will usually provide a double lock at the fenceline to prevent unauthorized trespassing.

3. Impacts on Land Use and Vegetation

The impact of a transmission line on land use and vegetation depends on the region through which it runs. For this reason, impacts in two distinctively different types of areas are considered here: (1) impacts in agricultural land and rural areas; and (2) impacts in woodlands and wetlands.

a. Agricultural and Rural Areas--Transmission lines generally have little impact on pasturelands and agricultural lands. Cattle and other forage animals do not interfere with the safety of the transmission line, and many crops can be grown under transmission lines with little interference. On the other hand, a transmission line can limit the use of property because of limitations regarding the height of machinery that can be used near the line and the height of crops which can be grown under the line.

When possible, rights-of-way are selected to avoid dense land uses such as commercial parcels, residential areas, highways and railroads.

b. Woodlands and Wetlands--In woodlands, it is necessary to clear the "overstory" (the high trees) in the right-of-way to protect the line. Clearing the overstory means that numerous trees have to be removed; however, on the positive side, this produces an ecological "edge," a transition area usually beneficial to wildlife.

Wetlands include hydric hammocks, hardwood swamps, cypress domes and riverine cypress, wet prairies, and freshwater marshes. Wetland vegetational communities can be impacted by construction in a number of ways. In "cypress heads," for example, the construction of a transmission line can rupture the "hardpan" soil layer under the cypress tress, causing the water table to drain. The cypress head can then dry out, making it highly susceptible to fire.

In other wetland vegetational communities--such as the hydric hammocks, riverine cypress and hardwood swamps--clearing the "canopy" (i.e., the crowns of trees) for a transmission line can alter the entire habitat, even if the roots of the trees are left intact. Canopy provides sunlight control and helps stabilize temperature and humidity. If the roots are removed along with the understory vegetation, erosion and turbidity can also become a problem.

4. Impact on Land Values

One question which commonly arises in a transmission line siting case is the impact of the proposed line on the land value of adjacent property. This is a complex question which depends on the type of property, the size of the line, the distance from the line to adjoining property, and the land use of the adjacent property. Because of these variables, it is impossible to predict with certainty the impact a line may have on a particular parcel of land. Ultimately, the value of adjacent property will be established either by a court of law in a "condemnation" proceeding, or by the market place.

Planners involved with the question of the impact of a transmission line on land values may wish to consult the studies listed in the Bibliography, Section 6. The study by Clark and Treadway examined the impacts of transmission lines in five case studies, and the Berkshire County Regional Planning Commission handbook, also reviewed five case studies.

While generalizations are not easy to make, it should be noted that in both of these reports, transmission lines were found to have relatively little impact on the value of adjoining property, except when the line actually reduced the amount of land under control of the owner, or when the line prevented the property from being used for commercial purposes.

5. Bibliography

CONSTRUCTION IMPACTS
(For case studies in Florida, see Bibliography, Chapter 9)

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IMPACTS ON LAND VALUES

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PART IV

ATTACHMENTS

ATTACHMENT I

THE POWER PLANT SITING ACT

403.514 Enforcement of compliance.—Failure to obtain a certification, or to comply with the conditions thereof, or to comply with this part shall constitute a violation of chapter 403.
History.—s. 1, ch. 73-33; s. 12, ch. 76-76.

403.515 Availability of information.—The department shall make available for public inspection and copying during regular office hours, at the expense of any person requesting copies, any information filed or submitted pursuant to this act.
History.—s. 1, ch. 73-33.

403.516 Modification of certification.—A certification may be modified after issuance in any one of the following ways:

(1) The board may delegate to the department the authority to modify specific conditions in the certification.

(2) The parties to the certification proceeding may modify the terms and conditions of the certification by mutual written agreement. Upon execution of the agreement by the parties, the provisions of s. 120.57 shall apply to the proceedings for approval or denial of the agreement by the board.

(3) If the parties to the certification proceeding are unable to reach a mutual written agreement on modification of the terms and conditions of the certification, a petition for modification setting forth:

(a) The proposed modification,

(b) The factual reasons asserted for the modification, and

(c) The anticipated effects of the proposed modification on the applicant, the public, and the environment

shall be filed with the Division of Administrative Hearings. The provisions of s. 120.57 shall apply to the proceedings for approval or denial of the petition by the board.

(4) As required by s. 403.511(5).
History.—s. 13, ch. 76-76; s. 10, ch. 81-131.

403.517 Supplemental applications for sites certified for ultimate site capacity.—

(1)(a) The department shall adopt rules governing the processing of supplemental applications for certification of the construction and operation of electrical power plants to be located at sites which have been previously certified for an ultimate site capacity pursuant to this part. Supplemental applications shall be limited to electrical power plants using the fuel type previously certified for that site. The rules adopted pursuant to this section shall include provisions for:

1. Prompt appointment of a designated hearing officer.
2. The contents of the supplemental application.
3. Resolution of disputes as to the completeness of supplemental applications by the designated hearing officer.
4. Public notice of the filing of the supplemental applications.
5. Time limits for prompt processing of supplemental applications.
6. Final disposition by the board within 7 months of the filing of a complete supplemental application.

(b) The time limits shall not exceed any time limitation governing the review of initial applications for site certification pursuant to this part, it being the legislative intent to provide shorter time limitations for the processing of supplemental applications for electrical power plants to be constructed and operated at sites which have been previously certified for an ultimate site capacity.

(c) Any time limitation in this section or in rules adopted pursuant to this section may be altered by the designated hearing officer upon stipulation between the department and the applicant or for good cause shown by any party. The parties to the proceeding shall adhere to the provisions of chapter 120 in considering and processing such supplemental applications. The department may charge a supplemental application fee not to exceed $25,000 to cover all reasonable expenses and costs of the review, processing, and proceedings of a supplemental application incurred by the department, the Division of Administrative Hearings, the Public Service Commission, the Department of Community Affairs, the water management district, or any other agency from which the department requests special studies pursuant to s. 403.507(1)(d). Any unused portion of the fee shall be refunded pursuant to s. 403.504.

(2) Supplemental applications shall be reviewed in accordance with the criteria and considerations of s. 403.507.

(3) The land use hearing requirements of s. 403.508(1) and (2) shall not be applicable to the processing of supplemental applications pursuant to this section so long as:

(a) The previously certified ultimate site capacity is not exceeded; and

(b) The lands required for the construction or operation of the electrical power plant which is the subject of the supplemental application are within the boundaries of the previously certified site.

(4) For the purposes of this part, the term "ultimate site capacity" means the maximum generating capacity for a site as certified by the board.
History.—s. 14, ch. 76-76; s. 11, ch. 81-131; s. 34, ch. 81-169; s. 38, ch. 83-55.

403.519 Exclusive forum for determination of need.—On request by a utility or on its own motion, the commission shall begin a proceeding to determine the need for an electrical power plant subject to the Florida Electrical Power Plant Siting Act. The commission shall be the sole forum for the determination of this matter, which accordingly shall not be raised in any other forum or in the review of proceedings in such other forum. In making its determination, the commission shall take into account the need for electric system reliability and integrity, the need for adequate electricity at a reasonable cost, and whether the proposed plant is the most cost-effective alternative available. The commission shall also expressly consider the conservation measures taken by or reasonably available to the applicant or its members which might mitigate the need for the proposed plant and other matters within its jurisdiction which it deems relevant. The commission's determination of need for an electrical power plant shall create a presumption of public need and necessity and shall serve as the commission's report required by s. 403.507(1)(b).
History.—s. 5, ch. 80-65.
cf.—ss. 366.80-366.85 Florida Energy Efficiency and Conservation Act.

board shall deem appropriate, or denying the issuance of a certificate and stating the reasons for issuance or denial. If the certificate is denied, the board shall set forth in writing the action the applicant would have to take to secure the board's approval of the application.

(2) In regard to the properties and works of any agency which is a party to the certification hearing, the board shall have the authority to decide issues relating to the use, the connection thereto, or the crossing thereof, for the electrical power plant and site and to direct any such agency to execute, within 30 days of the entry of certification, the necessary license or easement for such use, connection, or crossing, subject only to the conditions set forth in such certification.

(3) The issuance or denial of the certification by the board shall be the final administrative action required as to that application.

History.—s. 1, ch. 73-33; s. 7, ch. 76-76; s. 141, ch. 77-104.

403.5095 Alteration of time limits.—Any time limitation in this part may be altered by the designated hearing officer upon stipulation between the department and the applicant or for good cause shown by any party.

History.—s. 8, ch. 76-76.

403.510 Superseded laws, regulations, and certification power.—

(1) If any provision of this act is in conflict with any other provision, limitation, or restriction which is now in effect under any law or ordinance of this state or any political subdivision or municipality, or any rule or regulation promulgated thereunder, this act shall govern and control, and such other law or ordinance or rule or regulation promulgated thereunder shall be deemed superseded for the purposes of this act.

(2) The state hereby preempts the regulation and certification of electrical power plant sites and electrical power plants as defined in this act.

(3) The board shall have the power to adopt reasonable procedural rules to carry out its duties under this act and to give effect to the legislative intent that this act is to provide an efficient, simplified, centrally coordinated, one-stop permitting process.

History.—s. 1, ch. 73-33; s. 9, ch. 76-76.

403.511 Effect of certification.—

(1) Subject to the conditions set forth therein, any certification signed by the Governor shall constitute the sole license of the state and any agency as to the approval of the site and the construction and operation of the proposed electrical power plant, except as otherwise provided in subsection (4).

(2) The certification shall authorize the electric utility named therein to construct and operate the proposed electrical power plant, subject only to the conditions of certification set forth in such certification. Except as provided in subsection (4), the certification agreement may include conditions which constitute variances from nonprocedural standards or regulations of the department or any other standards or regulations of any other agency which were expressly considered during the proceeding and which otherwise would be applicable to the construction and operation of the proposed electrical power plant.

(3) The certification shall be in lieu of any license, permit, certificate, or similar document required by any agency pursuant to, but not limited to, chapter 161, chapter 253, chapter 298, chapter 370, chapter 373, chapter 380, chapter 381, chapter 387, chapter 404, the Florida Transportation Code, or 33 U.S.C. s. 1341.

(4) This part shall not affect in any way the ratemaking powers of the Public Service Commission under chapter 366; nor shall this part in any way affect the right of any local government to charge appropriate fees or require that construction be in compliance with local building codes, standards, and regulations.

(5)(a) An electrical power plant certified pursuant to this act shall comply with rules adopted by the department subsequent to the issuance of the certification which prescribe new or stricter criteria, to the extent that the rules are applicable to electrical power plants. Except when express variances have been granted, subsequently adopted rules which prescribe new or stricter criteria shall operate as automatic modifications to certifications.

(b) Any holder of a certification issued pursuant to this act may choose to operate the certified electrical power plant in compliance with any rule subsequently adopted by the department which prescribes criteria more lenient than the criteria required by the terms and conditions in the certification which are not site-specific.

(c) No term or condition of certification shall be interpreted to preclude the postcertification exercise by any party of whatever procedural rights it may have under chapter 120, including those related to rulemaking proceedings. This subsection shall apply to previously issued certifications.

History.—s. 1, ch. 73-33; s. 2, ch. 74-170; s. 10, ch. 76-76; s. 1, ch. 77-174; s. 83, ch. 79-65.

403.5111 County and municipal authority unaffected by chapter 75-22, Laws of Florida.—Except as provided in ss. 403.510 and 403.511, nothing in chapter 75-22, Laws of Florida, shall be construed to have altered the authority of county and municipal governments as provided by law.

History.—s. 22, ch. 75-22.

403.512 Revocation or suspension of certification.—Any certification may be revoked or suspended:

(1) For any material false statement in the application or in the supplemental or additional statements of fact or studies required of the applicant when a true answer would have warranted the board's refusal to recommend a certification in the first instance.

(2) For failure to comply with the terms or conditions of the certification.

(3) For violation of the provisions of this chapter or regulations or orders issued hereunder.

History.—s. 1, ch. 73-33; s. 11, ch. 76-76.

403.513 Review.—Proceedings under this part shall be subject to judicial review as provided in chapter 120.

History.—s. 1, ch. 73-33; s. 12, ch. 76-76.

(3) The department shall initiate the activities required by this section no later than 30 days after the complete application is filed. The department shall keep the applicant informed as to the progress of the studies and any issues raised thereby.

(4) The studies required by subsection (2) shall be completed no later than 7 months after the complete application is filed with the department.

History.—s. 1, ch. 73-33; s. 5, ch. 76-76; s. 133, ch. 79-190; s. 8, ch. 81-131; s. 33, ch. 81-169; s. 36, ch. 83-55.

403.508 Proceedings, parties, participants.—

(1) The designated hearing officer shall conduct a land use hearing in the county of the proposed site within 90 days of receipt of a complete application for electrical power plant site certification by the department. The place of such hearing shall be as close as possible to the proposed site. The department shall arrange for publication of notice of the land use hearing and of the deadline for filing of notice of intent to be a party at least 45 days before the date set for the land use hearing.

(2) The sole issue for determination at the land use hearing shall be whether or not the proposed site is consistent and in compliance with existing land use plans and zoning ordinances. The designated hearing officer's recommended order shall be issued within 30 days of completion of the hearing and shall be reviewed by the board within 45 days of receipt of the recommended order by the board. If it is determined by the board that the proposed site does conform with existing land use plans and zoning ordinances in effect as of the date of the application, the responsible zoning or planning authority shall not thereafter change such land use plans or zoning ordinances so as to affect the proposed site unless certification is subsequently denied. If it is determined by the board that the proposed site does not conform, it shall be the responsibility of the applicant to make the necessary application for rezoning. Should the application for rezoning be denied, the applicant may appeal this decision to the board, which may, if it determines after notice and hearing that it is in the public interest to authorize a nonconforming use of the land as a site for an electrical power plant, authorize a variance to the existing land use plan and zoning ordinances. In the event a variance is denied, no further action may be taken on the complete application by the department until the proposed site conforms to existing land use plans or zoning ordinances.

(3) A certification hearing shall be held by the designated hearing officer no later than 10 months after the complete application is filed with the department; however, an affirmative determination of need by the Public Service Commission pursuant to s. 403.519 shall be a condition precedent to the conduct of the certification hearing. At the conclusion of the certification hearing, the designated hearing officer shall, after consideration of all evidence of record, submit to the board a recommended order no later than 12 months after receipt of the complete application by the department.

(4)(a) Parties to the proceeding shall include:

1. The applicant.
2. The Public Service Commission.
3. The Department of Community Affairs.
4. The water management district, as defined in chapter 373, in the jurisdiction of which the proposed electrical power plant is to be located.
5. The department.

(b) Upon the filing with the department of a notice of intent to be a party at least 15 days prior to the date set for the land use hearing, the following shall also be parties to the proceeding:

1. Any county or municipality in whose jurisdiction the proposed electrical power plant is to be located.
2. Any state agency not listed in paragraph (a) as to matters within its jurisdiction.
3. Any domestic nonprofit corporation or association formed, in whole or in part, to promote conservation or natural beauty; to protect the environment, personal health, or other biological values; to preserve historical sites; to promote consumer interests; to represent labor, commercial, or industrial groups; or to promote orderly development of the area in which the proposed electrical power plant is to be located.

(c) Notwithstanding paragraph (4)(d), failure of an agency described in subparagraphs (4)(b)1. or (4)(b)2. to file a notice of intent to be a party within the time provided herein shall constitute a waiver of the right of that agency to participate as a party in the proceeding.

(d) Other parties may include any person, including those persons enumerated in paragraph (4)(b) who have failed to timely file a notice of intent to be a party, whose substantial interests are affected and being determined by the proceeding and who timely file a motion to intervene pursuant to chapter 120 and applicable rules. Intervention pursuant to this paragraph may be granted at the discretion of the designated hearing officer and upon such conditions as he may prescribe any time prior to 15 days before the commencement of the certification hearing.

(e) Any agency whose properties or works are being affected pursuant to s. 403.509(2) shall be made a party upon the request of the department or the applicant.

(5) When appropriate, any person may be given an opportunity to present oral or written communications to the designated hearing officer. If the designated hearing officer proposes to consider such communications, then all parties shall be given an opportunity to cross-examine or challenge or rebut such communications.

(6) The designated hearing officer shall have all powers and duties granted to hearing officers by chapters 120 and 403 and by the rules of the department and the Administration Commission, including the authority to resolve disputes over the completeness of an application for certification.

History.—s. 1, ch. 73-33; s. 6, ch. 76-76; s. 1, ch. 77-174; s. 134, ch. 79-190; s. 9, ch. 81-131; s. 36, ch. 81-167; s. 37, ch. 83-55.

403.509 Final disposition of application.—

(1) Within 60 days of receipt of the designated hearing officer's recommended order, the board shall act upon the application by written order, approving in whole, approving with such modification as the

unit to no greater capacity than the maximum operating capacity of the existing generator shall not constitute an alteration or addition to generating capacity which requires certification pursuant to this act.
History.—s. 1, ch. 73-33; s. 3, ch. 76-76; s. 2, ch. 79-76; s. 5, ch. 81-131.

403.5063 Notice of intent to file application.—

(1) To expedite the processing of the application which may be filed subsequently, the applicant for a proposed power plant may file a notice of intent to file an application with the department.

(2) The department shall establish, by rule, a procedure by which an applicant, after public notice, may enter into binding written agreements with the department and other affected agencies as to the scope, quantity, and level of information to be provided in the application, as well as the methods to be used in providing such information and the nature of the supporting documents to be included in the application.
History.—s. 6, ch. 81-131.

403.5065 Appointment of hearing officer; determination of completeness; amendment to the application.—

(1) Within 7 days of receipt of an application, whether complete or not, the department shall request the Division of Administrative Hearings to designate a hearing officer to conduct the hearings required by this act. The division director shall designate a hearing officer within 7 days of receipt of the request from the department. In designating a hearing officer for this purpose, the division director shall, whenever practicable, assign a hearing officer who has had prior experience or training in electric power plant site certification proceedings. Upon being advised that a hearing officer has been appointed, the department shall immediately file a copy of the application and all supporting documents with the designated hearing officer, who shall docket the application.

(2) Within 10 working days of receipt of an application, the department shall file a statement with the Division of Administrative Hearings and with the applicant declaring its position with regard to the completeness, not the sufficiency, of the application. If the department declares the application to be incomplete, then, within 15 working days of the receipt by the department of the application, the applicant shall file with the Division of Administrative Hearings and with the department a statement agreeing with the statement of the department and withdrawing the application or contesting the statement of the department. If the application is not withdrawn, the hearing officer shall schedule a hearing on the statement of completeness. The hearing shall be scheduled as expeditiously as possible, but no later than 30 days after the receipt of the application by the department. The designated hearing officer shall make his decision within 10 days of the hearing. If the designated hearing officer determines that the application was not complete as filed, then the applicant shall withdraw the application. If the hearing officer determines that the application was complete at the time it was filed, then the times provided in this act shall run from the date of the filing of such application.

(3) Any amendment made to the application after filing shall be served on all parties and agencies that have received the initial application.
History.—s. 4, ch. 76-76; s. 1, ch. 77-174; s. 7, ch. 81-131.

403.507 Reports and studies.—

(1) It shall be the duty of the department to provide copies of the application as filed, within 15 days of its receipt by the department, to the Department of Community Affairs, the Public Service Commission, and the water management district, created by chapter 373, in the jurisdiction of which the facility is to be located. The applicant, at its cost, shall furnish such information, studies, and data as the department may direct.

(a) Within 5 months of receipt of a copy of the complete application, the Department of Community Affairs shall present a report as to the compatibility of the proposed electrical power plant with the state comprehensive plan to the department. The Department of Community Affairs shall submit a preliminary report within 60 days of receipt of a copy of the complete application.

(b) The Public Service Commission shall prepare a report as to the present and future need for the electrical generating capacity to be supplied by the proposed electrical power plant. The report may include the comments of the commission with respect to any matters within its jurisdiction. It shall submit its report to the department within 5 months of receipt of a copy of the complete application. The commission shall submit a preliminary report within 60 days of receipt of a copy of the complete application.

(c) Within 5 months of receipt of a copy of the complete application, the water management district, as defined in chapter 373, in the jurisdiction of which the proposed electrical power plant is to be located shall prepare a report as to matters within its jurisdiction. The water management district shall submit a preliminary report within 60 days of receipt of a copy of the complete application.

(d) The department may request that any other agency perform studies and prepare reports as to matters within the jurisdiction of that agency which may be potentially affected by the proposed electrical power plant. Such studies or reports shall be submitted to the department within 5 months of receipt of a copy of the complete application by that agency.

(2) As needed to verify or supplement the studies made by the applicant in support of the application, it shall be the duty of the department to conduct, or contract for, studies of the proposed electrical power plant and site, including, but not limited to, the following:

(a) Cooling system requirements.
(b) Construction and operational safeguards.
(c) Proximity to transportation systems.
(d) Soil and foundation conditions.
(e) Impact on suitable present and projected water supplies for this and other competing uses.
(f) Impact on surrounding land uses.
(g) Accessibility to transmission corridors.
(h) Environmental impacts.

ulation; powers and duties enumerated.—The Department of Environmental Regulation shall have the following powers and duties in relation to this act:

(1) To adopt, promulgate, or amend reasonable rules to implement the provisions of this act, including rules setting forth environmental precautions to be followed in relation to the location and operation of electrical power plants.

(2) To prescribe the form and content of the notice of intent and the form, content, and necessary supporting documentation and studies to be prepared by the applicant for electric power plant site certification applications.

(3) To receive applications for electrical power plant site certifications and to determine the completeness and sufficiency thereof.

(4) To make, or contract for, studies of electrical power plant site certification applications.

(5) To administer the processing of applications for electric power plant site certifications and to ensure that the applications are processed as expeditiously as possible.

(6) To notify all affected agencies of the filing of an application within 15 days of receiving the complete application.

(7)(a) To require an application fee for certification not to exceed $50,000. The application fee shall be paid to the department upon the filing of each application for site certification. The fee shall be fixed by rule on a sliding scale related to the size, type, ultimate site capacity, or increase in generating capacity proposed by the application. A minimum fee of $5,000 shall be required for each application. All reasonable expenses and costs of the proceeding incurred by the department, the Division of Administrative Hearings, the Public Service Commission, the Department of Community Affairs, the water management district, created pursuant to chapter 373, in the jurisdiction of which the facility is to be located, or any other agency from which the department requests special studies pursuant to s. 403.507(1)(d), including those expenses and costs which are associated with the cost of publication of public notices, the preparation and conduct of the hearings, the recording and transcription of the proceedings, and the studies required of the agencies by this act, shall be paid from the application fee. Any sums remaining after the payment of authorized costs shall be refunded to the applicant within 90 days of the issuance or denial of certification or withdrawal of the application. The applicant shall be provided with an itemized accounting of the expenditures.

(b) To require a fee of $2,500 to be submitted to the department with a notice of intent. The notice-of-intent fee shall be used, disbursed, and refunded in the same manner as the application fee and shall be a credit toward the application fee.

(8) To prepare a written analysis which shall be filed with the designated hearing officer and served on all parties no later than 8 months after the complete application is filed with the department, and which shall include:

(a) A statement indicating whether the proposed electrical power plant and proposed ultimate site capacity will be in compliance with the rules of the department.

(b) The report from the Public Service Commission as required by ss. 403.507 and 403.519.

(c) The report of the Department of Community Affairs as required by s. 403.507.

(d) The report from the water management district as required by s. 403.507.

(e) The studies conducted pursuant to s. 403.507.

(f) The comments received by the department from any other agency.

(g) The recommendation of the department as to the disposition of the application and any proposed conditions of certification which the department believes should be imposed.

(9) To provide adequate public notice of the filing of the application and of the proceedings conducted pursuant to this part.

(10) To prescribe the means for monitoring the effects arising from the construction and operation of electrical power plants to assure continued compliance with terms of the certification.

(11) To notify all agencies affected of the filing of a notice of intent within 15 days of receipt of the notice and to publish public notice that the department has received such notice of intent.

(12) To require a certification modification fee, not to exceed $5,000, from the party petitioning for the modification, which fee shall be submitted to the department with a formal petition for modification to the department pursuant to s. 403.516(3). Any sums remaining after the proceeding shall be refunded to the petitioner within 90 days after approval or denial of the modification.

(13) To withhold from the application fee established by this section a reasonable sum sufficient to cover costs associated with postcertification review of activities required by any condition of certification. Such sums shall be specified as a part of each condition. Upon completion of any such reviews, any sums remaining shall be refunded to the applicant.

History.—s. 1, ch. 73-33; s. 1, ch. 76-76; s. 1, ch. 77-174; s. 132, ch. 79-190; s. 4, ch. 81-131; s. 35, ch. 81-167; s. 35, ch. 83-55.

403.506 Applicability and certification.—

(1) The provisions of this chapter shall apply to any electrical power plant as defined herein, except that the provisions of the Power Plant Siting Act shall not apply to any electrical power plant or steam generating plant of less than 50 megawatts in capacity unless the applicant has elected to apply for certification under this act. No construction of any new electrical power plant or expansion in steam generating capacity of any existing electrical power plant may be undertaken after October 1, 1973, without first obtaining certification in the manner as herein provided, except that this act shall not apply to any such electrical power plant which is presently operating or under construction or which has, upon the effective date of chapter 73-33, Laws of Florida, applied for a permit or certification under requirements in force prior to the effective date of such act.

(2) Except as provided in the certification, modification of nonnuclear fuels, internal related hardware, or operating conditions not in conflict with certification which increase the electrical output of a

403.502 Legislative intent.—The Legislature finds that the present and predicted growth in electric power demands in this state requires the development of a procedure for the selection and utilization of sites for electrical generating facilities and the identification of a state position with respect to each proposed site. The Legislature recognizes that the selection of sites and the routing of associated transmission lines will have a significant impact upon the welfare of the population, the location and growth of industry, and the use of the natural resources of the state. The Legislature finds that the efficiency of the permit application and review process at both the state and local level would be improved with the implementation of a process whereby a permit application would be centrally coordinated and all permit decisions could be reviewed on the basis of standards and recommendations of the deciding agencies. It is the policy of this state that, while recognizing the pressing need for increased power generation facilities, the state shall ensure through available and reasonable methods that the location and operation of electrical power plants will produce minimal adverse effects on human health, the environment, the ecology of the land and its wildlife, and the ecology of state waters and their aquatic life. It is the intent to seek courses of action that will fully balance the increasing demands for electrical power plant location and operation with the broad interests of the public. Such action will be based on these premises:

(1) To assure the citizens of Florida that operation safeguards are technically sufficient for their welfare and protection.

(2) To effect a reasonable balance between the need for the facility and the environmental impact resulting from construction and operation of the facility, including air and water quality, fish and wildlife, and the water resources and other natural resources of the state.

(3) To provide abundant, low-cost electrical energy.

History.—s. 1, ch. 73-33.

403.503 Definitions.—

(1) "Applicant" means any electric utility which makes application for an electric power plant site certification pursuant to the provisions of this act.

(2) "Application" means the documents required by the department to be filed to initiate a certification proceeding.

(3) "Person" means an individual, partnership, joint venture, private or public corporation, association, firm, public service company, political subdivision, municipal corporation, government agency, public utility district, or any other entity, public or private, however organized.

(4) "Electric utility" means cities and towns, counties, public utility districts, regulated electric companies, electric cooperatives, and joint operating agencies, or combinations thereof, engaged in, or authorized to engage in, the business of generating, transmitting, or distributing electric energy.

(5) "Site" means any proposed location wherein an electrical power plant, or an electrical power plant alteration or addition resulting in an increase in generating capacity, will be located, including offshore sites within state jurisdiction.

(6) "Certification" means the written order of the board approving an application in whole or with such modifications or conditions as the board may deem appropriate.

(7) "Electrical power plant" means, for the purpose of certification, any steam or solar electrical generating facility using any process or fuel, including nuclear materials, and includes associated facilities and those directly associated transmission lines required to connect the electrical power plant to an existing transmission network or rights-of-way to which the applicant intends to connect, except that this term does not include any steam or solar electrical generating facility of less than 50 megawatts in capacity unless the applicant for such a facility elects to apply for certification under this act.

(8) "Department" means the Department of Environmental Regulation.

(9) "Board" means the Governor and Cabinet sitting as the Siting Board.

(10) "Agency," as the context requires, means an official, officer, commission, authority, council, committee, department, division, bureau, board, section, or other unit or entity of government, including a regional or local governmental entity.

(11) "State comprehensive plan" means that plan prepared in accordance with the provisions of part I of chapter 23.

(12) "License" means a franchise, permit, certification, registration, charter, or similar form of authorization required by law, but it does not include a license required primarily for revenue purposes when issuance of the license is merely a ministerial act.

(13) "Designated hearing officer" means the hearing officer assigned by the Division of Administrative Hearings pursuant to chapter 120 to conduct the hearings required by this part.

(14) "Notice of intent" means that notice which is filed with the department on behalf of an electric utility prior to submission of an application pursuant to this act and which notifies the department of an intent to file an application.

(15) "Modification" means any change in the certification order after issuance, including a change in the conditions of certification.

(16) "Amendment" means any change in the application for certification made after the initial filing.

History.—s. 1, ch. 73-33; s. 1, ch. 76-76; s. 1, ch. 79-76; s. 3, ch. 81-131.

403.504 Department of Environmental Reg

ATTACHMENT II

THE TEN-YEAR SITE PLAN ACT

23.0191 Ten-year site plans.—

(1) Beginning January 1, 1974, each electric utility shall submit to the Department of Community Affairs a 10-year site plan which shall estimate its power-generating needs and the general location of its proposed power plant sites. The 10-year plan shall be reviewed and submitted not less frequently than every 2 years.

(2) Within 9 months of the receipt of the proposed plan, the department shall make a preliminary study of such plan and classify it as "suitable" or "unsuitable." The department may suggest alternatives to the plan. All findings of the department shall be made available to the Department of Environmental Regulation for its consideration at any subsequent electrical power plant site certification proceedings. It is recognized that 10-year site plans submitted by an electric utility are tentative information for planning purposes only and may be amended at any time at the discretion of the utility upon written notification to the department. A complete application for certification of an electrical power plant site under chapter 403, when such site is not designated in the current 10-year site plan of the applicant, shall constitute an amendment to the 10-year site plan. In its preliminary study of each 10-year site plan, the department shall consider such plan as a planning document and shall review:

(a) The need, including the need as determined by the Public Service Commission, for electrical power in the area to be served.

(b) The anticipated environmental impact of each proposed electrical power plant site.

(c) Possible alternatives to the proposed plan.

(d) The views of appropriate local, state, and federal agencies, including the views of the appropriate water management district as to the availability of water and its recommendation as to the use by the proposed plant of saltwater or freshwater for cooling purposes.

(e) The extent to which the plan is consistent with the state comprehensive plan.

(f) The plan with respect to the information of the state on energy availability and consumption.

(3) In order to enable it to carry out its duties under this section, the department may, after hearing, establish a study fee which shall not exceed $1,000 for each proposed plan studied.

(4) The department may adopt rules governing the method of submitting, processing, and studying the 10-year plans as required by this section.

History.—s. 1, ch 73-33; s. 2, ch. 76-76; s. 77, ch. 79-190.
Note.—Former s. 403.505.

ATTACHMENT III

THE TRANSMISSION LINE SITING ACT

403.52 Short title.—Sections 403.52-403.536 may be cited as the "Transmission Line Siting Act."
History.—s. 1, ch. 80-65.

403.521 *Legislative intent.*—The legislative intent of this act is to establish a centralized and coordinated permitting process for the location of transmission line corridors and the construction and maintenance of transmission lines, which necessarily involves several broad interests of the public addressed through the subject matter jurisdiction of several agencies. The Legislature recognizes that transmission lines will have an effect upon the welfare of the population. Recognizing the need to ensure electric power system reliability and integrity, and in order to meet electrical energy needs in an orderly and timely fashion, the centralized and coordinated permitting process established by this act is intended to further the legislative goal of ensuring through available and reasonable methods that the location of transmission line corridors and the construction and maintenance of transmission lines produce minimal adverse effects on the environment and public health, safety, and welfare. It is the intent of this act to fully balance the need for transmission lines with the broad interests of the public in order to effect a reasonable balance between the need for the facility as a means of providing abundant low-cost electrical energy and the impact on the public and the environment resulting from the location of the transmission line corridor and the construction and maintenance of the transmission lines. The Legislature intends that the provisions of chapter 120 apply to this act and to proceedings pursuant to it except as otherwise expressly exempted by other provisions of this part.
History.—s. 1, ch. 80-65; s. 2, ch. 83-222.

403.522 Definitions.—As used in this act:

(1) "Agency," as the context requires, means an official, officer, commission, authority, council, committee, department, division, bureau, board, section, or other unit or entity of government within the state, including a county, municipality, or other regional or local governmental entity.

(2) "Amendment" means a material change in information provided in the application for certification made after the initial application filing.

(3) "Applicant" means any electric utility which applies for certification pursuant to the provisions of this act.

(4) "Application" means the documents required by the department to be filed to initiate a certification proceeding. An electric utility may file a comprehensive application encompassing all or a part of one or more proposed transmission lines.

(5) "Board" means the Governor and Cabinet sitting as the siting board.

(6) "Certification" means the approval by the board of a corridor proper for certification pursuant to subsection (9) and the construction and maintenance of transmission lines within such corridor with such modifications or conditions as the board deems appropriate. Certification shall be evidenced by a written order of the board.

(7) "Commission" means the Florida Public Service Commission.

(8) "Completeness" means that the application has addressed all applicable sections of the prescribed application format, but does not mean that those sections are sufficient in comprehensiveness of data or in quality of information provided.

(9) "Corridor" means the proposed area within which a transmission line right-of-way is to be located. The width of the corridor proposed for certification by an applicant or other party, at the option of the applicant, may be the width of the transmission line right-of-way or wider, not to exceed a width of 1 mile. After all property interests required for the transmission line right-of-way have been acquired by the applicant, the boundaries of the area certified shall narrow to only that land within the boundaries of the transmission line right-of-way. The corridors proper for certification shall be those addressed in the application, in amendments to the application filed pursuant to s. 403.5275, and in notices of acceptance of proposed alternate corridors filed by an applicant and the department pursuant to s. 403.527(5).

(10) "Department" means the Department of Environmental Regulation.

(11) "Local government" means a municipality or county in the jurisdiction of which the project is proposed to be located.

(12) "Modification" means any change in the certification order after issuance, including a change in the conditions of certification.

(13) "Regional planning council" means a regional planning council as defined in s. 160.003(4) in the jurisdiction of which the project is proposed to be located.

(14) "Sufficiency" means that the application is not only complete but that all sections are sufficient in comprehensiveness of data or in quality of information provided.

(15) "Transmission line" means any electrical transmission line extending from, but not including, an existing or proposed substation or power plant to, but not including, an existing or proposed transmission network or rights-of-way or substation to which the applicant intends to connect which defines the end of the proposed project and which is designed to operate at 230 kilovolts or more and which crosses a county line. The starting point and ending point of a transmission line must be specifically defined by the applicant and must be verified by the commission in its determination of need. A transmission line includes structures and maintenance and access roads that need to be constructed for the project to become operational. If the proposed location of a corridor is affected by the applicant's proposed intermediate substations, then the general location of the proposed intermediate substation, and not the permitting of such substation, shall be considered in the certification proceedings.

(16) "Transmission line right-of-way" means land necessary for the construction and maintenance of a transmission line. The typical width of the

right-of-way shall be identified in the application. The right-of-way shall be located within the certified corridor and shall be identified by the applicant subsequent to certification in documents filed with the department prior to construction.

(17) "Water management district" means a water management district created pursuant to chapter 373 in the jurisdiction of which the project is proposed [1]to be located.

(18) The following words have the same meaning as appears in s. 403.503:

(a) "Electric utility."

(b) "License."

(c) "Person."

History.—s. 1, ch. 80-65; s. 3, ch. 83-222.

[1]**Note.**—The words "to be located" were inserted by the editors.

403.523 Department of Environmental Regulation; powers and duties.—The department shall have the following powers and duties:

(1) To adopt or amend reasonable procedural rules to implement the provisions of this act and to adopt or amend rules to implement the provisions of subsection (14).

(2) To prescribe the form, content, and necessary supporting documentation, and any required studies, for certification applications. All such data and studies shall be related to the jurisdiction of the agencies relevant to the application.

(3) To receive applications for transmission line and corridor certifications and initially determine the completeness and sufficiency thereof.

(4) To make or contract for studies of certification applications. All such studies shall be related to the jurisdiction of the agencies relevant to the application. For studies in areas outside the jurisdiction of the department and in the jurisdiction of another agency, the department may initiate such studies, but only with the consent of such agency.

(5) To administer the processing of applications for certification and ensure that the applications are processed as expeditiously as possible.

(6) To notify all affected agencies of the filing of an application and of the filing of subsequent amendments within 15 days after receiving the complete application or subsequent amendments.

(7) To require an application fee, which shall be paid to the department upon the filing of each application for corridor certification. The application fee shall be $750 for each mile of the proposed transmission line corridor. A minimum fee of $20,000 shall be required for each application. The application fee shall be used to pay those expenses associated with the cost of the preparation and conduct of the hearings, the recording and transcription of the proceedings, the studies required by this act, and agency travel and per diem. Salaries for full-time state agency employees, excluding other personal services employees, may not be charged against the fee. If any sums remain after payment of such expenses, the application fee shall be applied pro rata to reimburse all reasonable expenses pursuant to this act incurred by the agencies. Any sums remaining after the payment of all authorized costs shall be refunded to the applicant within 90 days after the issuance or denial of certification or the withdrawal of the application. The applicant shall be provided with an itemized accounting of the expenditures.

(8) To prepare a compilation of agency reports and summaries of the material contained therein which shall be filed with the hearing officer and served on all parties no later than 4 months after the complete application is filed with the department, and which shall include:

(a) The studies and reports required by ss. 403.526 and 403.537, including the recommendations of the department relating to the disposition of the application.

(b) Comments received from any other agency.

(9) To provide public notice of the filing of the application and of the proceedings conducted pursuant to this act.

(10) To prescribe the means for monitoring the effects arising from the location of the transmission line corridor and the construction and maintenance of the transmission lines to assure continued compliance with the terms of the certification.

(11) To require a certification modification fee. If no corridor alignment change is proposed by the applicant, the modification fee shall be $2,000. If a corridor alignment change is proposed by the applicant, the fee shall be $2,000 plus $750 for each mile of realignment. Such fee shall be submitted to the department upon notification by an applicant that modification pursuant to s. 403.5315(2) or (3) is sought, and which shall be used, disbursed, and accounted for in the same manner as the application fee.

(12) To make a determination of acceptability of any alternate corridor proposed for consideration pursuant to s. 403.527(5).

(13) To withhold from the fees established by this section a reasonable sum sufficient to cover the costs associated with postcertification review of activities required by any condition of certification. Such sums shall be specified as part of each condition.

(14) To set requirements that reasonably protect the public health, safety, and welfare from the electric and magnetic fields of transmission lines for which an application is filed after the effective date of this act.

(15) To present rebuttal evidence on any issue properly raised at the certification hearing.

History.—s. 1, ch. 80-65; s. 37, ch. 81-167; s. 265, ch. 81-259; s. 39, ch. 83-55; s. 4, ch. 83-222.

403.524 Applicability and certification.—

(1) The provisions of this act apply to each transmission line, except a transmission line certified pursuant to the Florida Electrical Power Plant Siting Act.

(2) Except as provided in subsection (1), no construction of any transmission line may be undertaken without first obtaining certification under this act, but the provisions of this act do not apply to:

(a) Transmission lines for which development approval has been obtained pursuant to chapter 380.

(b) Transmission lines which have been exempted by a binding letter of interpretation issued under s. 380.06(4), or in which the Department of Community Affairs or its predecessor agency has determined the utility to have vested development rights within the meaning of s. 380.05(18) or s. 380.06(17).

(c) Transmission line development in which all construction is limited to established rights-of-way. Established rights-of-way include such rights-of-way for roads, highways, railroads, gas, water, oil, electricity, or sewage and any other public purpose rights-of-way. Except for transmission line rights-of-way, established rights-of-way include rights-of-way created before or after October 1, 1983. For transmission line rights-of-way, established rights-of-way include rights-of-way created before October 1, 1983.

(d) Transmission lines less than 15 miles in length which cross a county line, unless the applicant has elected to apply for certification under the act.

(3) The exemption of a transmission line under this act does not constitute an exemption for the transmission line from other applicable permitting processes under other provisions of law or local government ordinances.

(4) A utility shall notify the department in writing, prior to the start of construction, of its intent to construct a transmission line exempted pursuant to this section. Such notice shall be only for information purposes, and no action by the department shall be required pursuant to such notice.

History.—s. 1, ch. 80-65; s. 14, ch. 81-131; s. 38, ch. 81-167; s. 40, ch. 83-55; s. 5, ch. 83-222.

403.525 Appointment of hearing officer; determination of completeness or sufficiency.—

(1) Within 7 days after receipt of an application, whether complete or not, the department shall request the Division of Administrative Hearings to designate a hearing officer to conduct the hearings required by this act. The division director shall designate a hearing officer to conduct the hearings required by this act within 7 days after receipt of the request from the department. Whenever practicable, the division director shall assign a hearing officer who has had prior experience or training in this type of certification proceeding. Upon being advised that a hearing officer has been designated, the department shall immediately file a copy of the application and all supporting documents with the hearing officer, who shall docket the application.

(2) Within 20 working days after receipt of an application or an amendment, the department shall file a statement with the Division of Administrative Hearings and with the applicant, declaring its position with regard to the completeness, not the sufficiency, of the application or amendment. If the department declares the application or amendment to be incomplete, then, within 15 days after the filing of the statement by the department, the applicant shall file with the Division of Administrative Hearings and with the department a statement agreeing with the statement of the department and withdrawing the application or amendment, a statement contesting the statement of the department, or supplemental information which makes the application or amendment complete. If the determination by the department that an application or amendment is incomplete and is contested, the hearing officer shall schedule a hearing on the statement of completeness. The hearing shall be held as expeditiously as possible, but no later than 14 days from the filing of the statement contesting the determination of the department. The hearing officer shall make a decision within 10 days after the hearing. If the hearing officer determines that the application or amendment was not complete as filed, then the applicant shall withdraw the application or amendment or make such additional submittals so as to complete it. If the hearing officer determines that the application was complete at the time it was filed, then the time provided in this act shall run from the date of the filing of such application.

(3) The department may by rule adopt procedures similar to those set forth in subsection (2) for the determination of the sufficiency of an application by the department, based on the recommendations of the agencies required to submit reports pursuant to s. 403.526. If contested by the applicant, the final decision on sufficiency shall be made by the hearing officer.

History.—s. 1, ch. 80-65; s. 6, ch. 83-222.

403.526 Reports and studies.—

(1) It shall be the duty of the department to provide copies of each application, within 7 days after filing, to the commission, the Department of Natural Resources, the Department of Community Affairs, the Game and Fresh Water Fish Commission, each water management district, each regional planning council, and each local government in the jurisdiction of which the proposed transmission line or corridor is to be located.

(2) The department shall prepare a report as to the impact of each proposed transmission line or corridor as it relates to matters within its jurisdiction.

(3) The Department of Natural Resources shall prepare a report as to the impact of each proposed transmission line or corridor on matters within its jurisdiction and shall submit its report to the department within 90 days after receipt of a copy of the complete application.

(4) Each water management district in the jurisdiction of which a proposed transmission line or corridor is to be located shall prepare a report as to the impact on water resources and other matters within its jurisdiction and shall submit its report to the department within 90 days after receipt of a copy of the complete application.

(5) The Department of Community Affairs shall prepare a report as to the impact of each proposed transmission line or corridor on land use and other matters within its jurisdiction and shall submit its report to the department within 90 days after receipt of the completed application.

(6) The Game and Fresh Water Fish Commission shall prepare a report as to the impact of each proposed transmission line or corridor on fish and wildlife resources and other matters within its jurisdiction and shall submit its report to the department within 90 days after receipt of the completed application.

(7) Each local government shall prepare a report as to the impact of each proposed transmission line or corridor on matters within its jurisdiction, or shall by resolution adopt the report prepared by the ap-

propriate regional planning council as required by subsection (8). It shall submit its report or resolution to the department within 90 days after its receipt of the complete application.

(8) Each regional planning council shall prepare a report on the impacts of each proposed transmission line or corridor on matters within its jurisdiction. It shall submit its report within 90 days after its receipt of the complete application.

(9) The report shall contain the information on variances required by s. 403.531(2) and proposed conditions of certification on matters within the jurisdiction of each agency. For each condition proposed by an agency, the agency shall list the specific statute, rule, or ordinance, as applicable, which authorizes the proposed condition.

(10) Each reviewing agency shall initiate the activities required by this section no later than 15 days after the complete application is filed. Preliminary reports shall be submitted to the department no later than 60 days after the receipt of a completed application by the department. Such reports shall be made available to each local government for use as information for public meetings pursuant to s. 403.5272. Each agency shall keep the applicant informed as to the progress of its studies and any issues raised thereby.

(11) The failure of any agency to submit a preliminary report or a report, or to submit its preliminary report or report within the allowed time, shall not be grounds for the alteration of any time limitation in this act pursuant to s. 403.528. Neither the failure to submit a preliminary report or a report nor the inadequacy of the preliminary report or report shall be grounds to deny or condition certification.

History.—s. 1, ch. 80-65; s. 39, ch. 81-167; s. 41, ch. 83-55; s. 7, ch. 83-222.

403.527 Notice, proceedings, parties, participants.—

(1)(a) No later than 15 days after the receipt of an application, the department shall arrange for publication of a notice of the application and of the proceedings required by this act.

(b) The department shall arrange for publication of a notice of the certification hearing and other public hearings provided for in this section and notice of the deadline for filing of notice of intent to be a party. Such notices shall be published at least 80 days before the date set for the hearing.

(c) The department shall arrange for publication of a reminder notice in the newspapers specified in paragraph (d) no more than 2 weeks prior to the certification hearing, reminding the public of the date and location of the hearing. This notice shall not constitute a point of entry for intervention in the proceeding.

(d) Notices shall be published:

1. In newspapers of general circulation within counties crossed by the transmission line corridors proper for certification. The required newspaper notices, other than the reminder notice, shall be one-half page in size in a standard-size newspaper or a full page in a tabloid-size newspaper. These notices shall include a map generally depicting all transmission corridors proper for certification. A newspaper of general circulation shall be the newspaper within a county crossed by a transmission line corridor proper for certification which newspaper has the largest daily circulation in that county and has its principal office in that county. If the newspaper with the largest daily circulation has its principal office outside the county, then the notices shall appear in both the newspaper having the largest circulation in that county and in a newspaper authorized to publish legal notices in that county;

2. In the Florida Administrative Weekly; and

3. By giving notice to any persons who have requested to be placed on the departmental mailing list for this purpose.

(e) The department shall adopt rules specifying the content of notices required by this section. All published notices shall be paid for by the applicant and shall be in addition to the application fee. The department shall arrange for publication of notices required by this section.

(2) No later than 150 days after receipt of a complete application by the department, the hearing officer shall conduct a certification hearing pursuant to s. 120.57 at a central location in proximity to the proposed transmission line or corridor. One public hearing where members of the public who are not parties to the certification hearing may testify shall be held within the boundaries of each county, at the option of any local government. The local government shall notify the hearing officer and all parties not later than 50 days after the receipt of a complete application as to whether the local government wishes to have such a public hearing. The local government shall be responsible for [1]determining the location of the public hearing. Within 5 days of such notification, the hearing officer shall determine the date of such public hearing, which shall be held before or during the certification hearing. In the event two or more local governments within one county request such a public hearing, the hearing shall be consolidated so that only one such public hearing is held in any county. The location of a consolidated hearing shall be determined by the hearing officer. If a local government does not request a public hearing within 50 days after the receipt of a complete application, persons residing within [2]the jurisdiction of such local government may testify at the public hearing portion of the certification hearing.

(3)(a) At the conclusion of the certification hearing, the hearing officer shall, after consideration of all evidence of record, issue a recommended order disposing of the application no later than 50 days after the transcript of the certification hearing and the public hearings is filed with the Division of Administrative Hearings.

(b) In the event the hearing officer fails to issue a recommended order within 50 days after the filing of the hearing transcript, the hearing officer shall submit a report to the board with a copy to all parties within 50 days after the filing of the hearing transcript to advise the board of the reason for the delay in the issuance of the recommended order and of the date by which the recommended order will be issued.

(4)(a) Parties to the proceeding shall be:

1. The applicant.

2. The department.

3. The commission.
4. The Department of Community Affairs.
5. The Department of Natural Resources.
6. The Game and Fresh Water Fish Commission.
7. Each water management district in the jurisdiction of which the proposed transmission line or corridor is to be located.
8. Any local government.
9. Regional planning councils.

(b) Any party listed in paragraph (a) may waive its right to participate in these proceedings. If any listed party fails to file a notice of its intent to be a party on or before the 30th day prior to the certification hearing, such party shall be deemed to have waived its right to be a party unless its participation would not prejudice the rights of any party to the proceeding.

(c) Notwithstanding the provisions of chapter 120 to the contrary, upon the filing with the hearing officer of a notice of intent to be a party by an agency or corporation or association described in subparagraphs 1. and 2. or a petition for intervention by a person described in subparagraph 3. no later than 30 days prior to the date set for the certification hearing, the following shall also be parties to the proceeding:

1. Any state agency not listed in paragraph (a) as to matters within its jurisdiction.
2. Any domestic nonprofit corporation or association formed, in whole or in part, to promote conservation of natural beauty; to protect the environment, personal health, or other biological values; to preserve historical sites; to promote consumer interests; to represent labor, commercial, or industrial groups; or to promote orderly development of the area in which the proposed transmission line or corridor is to be located.
3. Any person whose substantial interests are affected and being determined by the proceeding.

(d) Any agency whose properties or works may be affected shall be made a party upon the request of the agency or any party to this proceeding.

(5)(a) No later than 50 days prior to the certification hearing, any party may propose alternate transmission line corridor routes for consideration pursuant to the provisions of this act by filing a notice of a proposed alternate corridor with the hearing officer, all parties, and any local governments in whose jurisdiction the alternate is proposed. Such filing shall include the most recent United States Geological Survey 1:24000 quadrangle maps specifically delineating the corridor boundaries, a description of the proposed corridor, and a statement of the reasons the proposed alternate should be certified.

(b) Within 5 working days of receipt of such notice, the applicant and the department shall file with the hearing officer and all parties a notice of acceptance or rejection of a proposed alternate corridor for consideration. If the alternate corridor is rejected either by the applicant or the department, the certification hearing and the public hearings shall be held as scheduled. If both the applicant and the department accept a proposed alternate corridor for consideration, the certification hearing and the public hearings shall be rescheduled, if necessary.

(c) If rescheduled, the certification hearing shall be held no more than 80 days from the previously scheduled certification hearing, to provide sufficient time:

1. For the publication of notice pursuant to paragraphs (1)(b) and (c);
2. For the agencies listed in s. 403.526 to file supplementary reports addressing the proposed alternate corridors at least 30 days prior to the certification hearing; and
3. For agencies to submit supplementary notice pursuant to s. 403.531(2) at least 30 days prior to the certification hearing.

(d) Each party proposing an alternate corridor shall have the burden of providing data to the agencies listed in s. 403.526 necessary for the preparation of a supplementary report on the proposed alternate corridor within a time period established by the department and shall have the burden of proof on the certifiability of the alternate corridor at the certification hearing pursuant to s. 403.529(3). Nothing in this act shall be construed as requiring the applicant or agencies not proposing the alternate to submit data in support of such alternate corridor.

(e) Notwithstanding the rejection of a proposed alternate corridor by the applicant or the department, any party may present evidence at the certification hearing to show that a corridor proper for certification does not satisfy the criteria listed in s. 403.529 or that a rejected alternate corridor would meet the criteria set forth in s. 403.529. No evidence shall be admitted at the certification hearing on any alternate corridor, unless the alternate corridor was proposed by the filing of a notice at least 50 days prior to the certification hearing pursuant to this subsection. Rejected alternate corridors shall be considered by the board as provided in s. 403.529(3) and (4).

(f) If an alternate corridor is accepted by the applicant and the department pursuant to a notice of acceptance as provided in this subsection and such corridor is ultimately determined to be the corridor that would meet the criteria set forth in s. 403.529(3) and (4), the board shall certify that corridor.

(6) When appropriate, any person may be given an opportunity to present oral or written communications to the hearing officer. If the hearing officer proposes to consider such communications, all parties shall be given an opportunity to cross-examine or challenge or rebut such communications.

(7) The hearing officer shall have all powers and duties granted to hearing officers by chapter 120 and by the laws and rules of the department, including the authority to resolve disputes over the completeness or sufficiency of an application for certification.

History.—s. 1, ch. 80-65; s. 40, ch. 81-167; s. 42, ch. 83-55; s. 8, ch. 83-222.
[1]**Note.**—The word "determining" was inserted by the editors.
[2]**Note.**—The words "the jurisdiction of" were inserted by the editors.

403.5272 Local governments; informational public meetings.—

(1) Local governments may hold informational public meetings in addition to the hearings specifically authorized by this act on any matter associated with the transmission line proceeding. Such informational public meetings should be held no later than

80 days after the application is filed. The purpose of an informational public meeting is for the local government to further inform the general public about the transmission line proposed, obtain comments from the public, and formulate its recommendation with respect to the proposed transmission line.

(2) Informational public meetings shall be held solely at the option of each local government. It is the legislative intent that local governments attempt to hold such public meetings. Parties to the proceedings under this act shall be encouraged to attend; however, no party shall be required to attend such informational public hearings.

(3) The failure to hold an informational public meeting or the procedure used for the informational public meeting shall not be grounds for the alteration of any time limitation in this act pursuant to s. 403.528 or grounds to deny or condition certification.

History.—s. 9, ch. 83-222.

403.5275 Amendment to the application.—

(1) Any amendment made to the application shall be sent by the applicant to the hearing officer and to all parties to the proceeding. No additional fee shall be required for the submittal of an amendment to the application if no corridor alignment change is proposed by the amendment. However, if a corridor alignment change is proposed by the applicant, an additional fee of a minimum of $2,000 and $750 per mile shall be submitted to the department for use in accordance with s. 403.523. Amendments that are required to address issues, including alternate corridors pursuant to s. 403.527(5), raised by the department or other parties do not require additional fees.

(2) Any amendment to the application made prior to certification shall be disposed of as part of the original certification proceeding. Amendment of the application may be considered "good cause" for alteration of time limits pursuant to s. 403.528.

History.—s. 1, ch. 80-65; s. 10, ch. 83-222.

403.528 Alteration of time limits.—Any time limitation in this act may be altered by the hearing officer upon stipulation between the department and the applicant unless objected to by any party within 5 days after notice or for good cause shown by any party.

History.—s. 1, ch. 80-65; s. 11, ch. 83-222.

403.529 Final disposition of application.—

(1) Within 30 days after receipt of the hearing officer's recommended order, the board shall act upon the application by written order, approving in whole, approving with such modification and conditions as the board deems appropriate, or denying the certification and stating the reasons for issuance or denial.

(2) If certification is denied, the board shall set forth in writing the action the applicant would have to take to secure the approval of the application by the board.

(3) In determining whether an application should be approved in whole, approved with modifications or conditions, or denied, the board shall consider whether, and the extent to which, the location of the transmission line corridor and the construction and maintenance of the transmission line will:

(a) Ensure electric power system reliability and integrity;

(b) Meet the electrical energy needs of the state in an orderly and timely fashion;

(c) Comply with nonprocedural requirements of agencies;

(d) Be consistent with applicable local government comprehensive plans; and

(e) Effect a reasonable balance between the need for the transmission line as a means of providing abundant low-cost electrical energy and the impact upon the public and the environment resulting from the location of the transmission line corridor and maintenance of the transmission lines.

(4)(a) Any transmission line corridor certified by the board shall meet the criteria of this section. When more than one transmission line corridor is proper for certification pursuant to s. 403.522(9) and meets the criteria of this section, the board shall certify the transmission line corridor that has the least adverse impact regarding the criteria in subsection (3), including costs.

(b) If the board finds that an alternate corridor rejected pursuant to s. 403.527(5) meets the criteria of subsection (3) and has the least adverse impact regarding the criteria in subsection (3), including cost, of all corridors that meet the criteria of subsection (3), then the board shall deny certification or shall allow the applicant to submit an amended application to include such corridor.

(c) If the board finds that two or more of the corridors that comply with the provisions of subsection (3) have the least adverse impacts regarding the criteria in subsection (3), including costs, and that such corridors are substantially equal in adverse impacts regarding the criteria in subsection (3), including costs, then the board shall certify the corridor preferred by the applicant if the corridor is one proper for certification pursuant to s. 403.522(9).

(5) The issuance or denial of the certification by the board shall be the final administrative action required as to that application.

History.—s. 1, ch. 80-65; s. 12, ch. 83-222.

403.531 Effect of certification.—

(1) Subject to the conditions set forth therein, certification shall constitute the sole license of the state and any agency as to the approval of the location of transmission line corridors and the construction and maintenance of transmission lines. The certification shall be valid for the life of the transmission line, provided that construction on, or condemnation or acquisition of, the right-of-way is commenced within 5 years of the date of certification or such later date as may be authorized by the board.

(2) The certification shall authorize the applicant to locate the transmission line corridor and to construct and maintain the transmission lines subject only to the conditions of certification set forth in such certification. The certification may include conditions which constitute variances and exemptions, otherwise allowed by law, from nonprocedural standards or regulations of the department or any other agency, which were expressly considered during the proceeding unless waived by the agency as provided below and which otherwise would be applicable to

the location of the proposed transmission line corridor or the construction and maintenance of the transmission lines. Each party shall notify the applicant and other parties at least 60 days prior to the certification hearing of any nonprocedural requirements not specifically listed in the application from which a variance or exception is necessary in order for the board to certify any corridor proposed for certification. Failure of such notification shall be treated as a waiver, variance, or exception, otherwise allowed by law, from nonprocedural standards or regulations of the department or any other agency.

(3) The certification shall be in lieu of any license, permit, certificate, or similar document required by any agency pursuant to, but not limited to, chapter 125, chapter 161, chapter 163, chapter 253, chapter 258, chapter 298, chapter 370, chapter 373, chapter 380, chapter 381, chapter 387, chapter 403, chapter 404, the Florida Transportation Code, or 33 U.S.C. s. 1341. On certification, any license, easement, or other interest in state lands, except those the title of which is vested in the Board of Trustees of the Internal Improvement Trust Fund, shall be issued by the appropriate agency as a ministerial act. The applicant shall be required to seek any necessary interest in state lands the title to which is vested in the Board of Trustees of the Internal Improvement Trust Fund from the board of trustees before, during, or after the certification proceeding, and certification may be made contingent upon issuance of the appropriate interest in realty. However, neither the applicant nor any party to the certification proceeding may directly or indirectly raise or relitigate any matter which was or could have been an issue in the certification proceeding in any proceeding before the Board of Trustees of the Internal Improvement Trust Fund wherein the applicant is seeking a necessary interest in state lands, but the information presented in the certification proceeding shall be available for review by the board of trustees and its staff.

(4) This part shall not in any way affect the ratemaking powers of the commission under chapter 366. This part shall also not in any way affect the right of any local government to charge appropriate fees or require that construction be in compliance with the National Electrical Safety Code, as prescribed by the commission.

(5) No term or condition of certification shall be interpreted to preclude the postcertification exercise by any party of whatever procedural rights it may have under chapter 120, including those related to rulemaking proceedings.

History.—s. 1, ch. 80-65; s. 266, ch. 81-259; s. 13, ch. 83-222.

403.5312 Recording of notice of certified corridor route.—Within 60 days after certification of a directly associated transmission line pursuant to ss. 403.501-403.517 or a transmission line corridor pursuant to ss. 403.52-403.536, the applicant shall file, in accordance with s. 28.222, with the clerk of the circuit court for each county through which the corridor will pass, a notice of the certified route. The notice shall consist of maps or aerial photographs in the scale of 1:24,000 which clearly show the location of the certified route and shall state that the certification of the corridor will result in the acquisition of rights-of-way within the corridor. Each clerk shall record the filing in the official record of the county for the duration of the certification or until such time as the applicant certifies to the clerk that all lands required for the transmission line rights-of-way within the corridor have been acquired within such county, whichever is sooner. The recording of this notice shall not constitute a lien, cloud, or encumbrance on real property.

History.—s. 12, ch. 81-131.

403.5315 Modification of certification.—A certification may be modified after issuance in any one of the following ways:

(1) The board may delegate to the department the authority to modify specific conditions in the certification.

(2) The department may modify the terms and conditions of the certification if no party objects in writing to such modification within 45 days after notice by mail to the last address of record in the certification proceeding, and if no other person whose substantial interests will be affected by the modification objects in writing within 30 days after issuance of public notice.

(3) If the parties to the certification proceeding are unable to reach a mutual written agreement on modification of the terms and conditions of the certification, the applicant may file a petition for modification with the department setting forth:

(a) The proposed modification;

(b) The factual reasons asserted for the modification; and

(c) The anticipated additional environmental effects of the proposed modification.

(4) Petitions filed pursuant to subsection (3) shall be disposed of in the same manner as an application but with shortened time periods commensurate with the significance of the modification requested.

History.—s. 1, ch. 80-65; s. 15, ch. 83-222.

403.532 Revocation or suspension of certification.—Any certification may be revoked or suspended:

(1) For any material false statement in the application or in the supplemental or additional statements of fact or studies required of the applicant when a true answer would have warranted the board's refusal to recommend a certification in the first instance.

(2) For failure to comply with the terms or conditions of the certification.

(3) For violation of the provisions of this act or rules or orders issued hereunder.

History.—s. 1, ch. 80-65.

403.533 Enforcement of compliance.—Failure to obtain a certification, or to comply with the conditions thereof, or to comply with this part shall constitute a violation of chapter 403.

History.—s. 1, ch. 80-65.

403.536 Superseded laws, regulations, and certification power.—

(1) If any provision of this act is in conflict with any other provision, limitation, or restriction which is now in effect under any law of this state or any ordinance of a local government, political subdivision, or municipality, or any rule or regulation adopted thereunder, this act shall control.

(2) The state hereby preempts the certification of transmission lines and transmission line corridors.

(3) The board shall have the power to adopt reasonable procedural rules to carry out its duties under this act and to give effect to the legislative intent that this act provide an efficient, centrally coordinated, one-stop permitting process.

History.—s. 1, ch. 80-65.

403.537 Determination of need for transmission line; powers and duties.—

(1)(a) Upon request by an electric utility or upon its own motion, the Florida Public Service Commission shall schedule a public hearing, after notice, to determine the need for a transmission line regulated by the Transmission Line Siting Act, ss. 403.52-403.536. Such notice shall be published at least 20 days before the date set for the hearing and shall be published in newspapers of general circulation, in the Florida Administrative Weekly, by giving notice to counties and regional planning councils in whose jurisdiction the transmission line could be placed, and by giving notice to any persons who have requested to be placed on the mailing list of the commission for this purpose. Within 21 days after receipt of a request for determination by an applicant, the commission shall set a date for the hearing. The hearing shall be held pursuant to s. 350.01 within 45 days after the filing of the request, and a decision shall be rendered within 60 days after such filing.

(b) In the determination of need, the commission shall take into account the need for electric system reliability and integrity, the need for abundant, low-cost electrical energy to assure the economic well-being of the citizens of this state, the appropriate starting and ending point of the line, and other matters within its jurisdiction deemed relevant to the determination of need.

(c) The determination by the commission of the need for the transmission line, as defined in s. 403.522(15), is binding on all parties to any certification proceeding pursuant to the Transmission Line Siting Act and is a condition precedent to the conduct of the certification hearing prescribed therein. An order entered pursuant to this section constitutes final agency action.

(2) The commission shall have the following powers and duties:

(a) To adopt or amend reasonable procedural rules to implement the provisions of this section.

(b) To prescribe the form, content, and necessary supporting documentation and the required studies for the determination of need.

(3) Any time limitation in this section may be altered by the commission upon stipulation between the commission and the applicant or for good cause shown by any party.

History.—s. 3, ch. 80-65; s. 13, ch. 81-131; s. 19, ch. 83-222.

403.539 Certification admissible in eminent domain proceedings; attorney's fees and costs.
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(1) Certification pursuant to ss. 403.52-403.536 shall be admissible as evidence of public need and necessity in proceedings under chapter 73 or chapter 74.

(2) No party may rely on this section or any provision of chapter 73 or chapter 74 to request the award of attorney's fees or costs incurred as a result of participation in the certification proceeding.

History.—s. 2, ch. 80-65; s. 20, ch. 83-222.

ATTACHMENT IV

CHAPTER 17-17, FLORIDA ADMINISTRATIVE CODE

PART II

PART I

17-17.01 General.
Specific Authority: 403.502, 403.509(1), F.S. Law Implemented: 403.502, F.S. History: New 5-7-74, Amended 12-27-77, Transferred to 17-17.011, 5-9-83.

17-17.011 General.
(1) The purpose of this chapter is to implement the provisions of the Florida Electrical Power Plant Siting Act, as amended.

(2) The department promulgates this chapter pursuant to the charge of the legislature to provide efficient, centralized review of the needs for increased electrical power generation and the effects of generation-related activities on human health and the environment and ecology of the lands and waters within the state.

(3) Upon application, the Board is authorized to certify a site for maximum predicted steam or solar generation pursuant to Chapter 17-17, Part I, FAC. The applicant shall submit a supplemental application for certification of the construction and operation of additional electrical power plants to be located at sites which have been previously certified for an ultimate site capacity. The supplemental application shall show that the additional unit or units conform to the environmental standards being enforced by federal or state governments having jurisdiction at the time of the supplemental application and shall be subject to this chapter.
Specific Authority: 403.502, 403.504(1), 403.509(1), F.S. Law Implemented: 403.502, 403.504(2)(3)(5), F.S. History: New 5-7-74, Amended 12-27-77, Formerly 17-17.01, Amended 5-9-83.

17-17.02 Definitions.
Specific Authority: 403.502, 403.503, F.S. Law Implemented: 403.504(1), 403.517, F.S. History: New 5-7-74, Amended 12-27-77, Transferred to 17-17.021, 5-9-83.

17-17.021 Definitions.
Words, terms and phrases used in this chapter, unless otherwise indicated, shall have the meaning set forth in Section 403.031 and 403.503, Florida Statutes. In addition, the following words when used in this chapter shall have the indicated meanings:

(1) "Act" means the Florida Electrical Power Plant Siting Act, Section 403.501 through 403.517, F.S., as amended.

(2) "Construction" means any clearing of land, excavation or other action which would alter the physical environment or ecology of a site, but does not include those activities essential for surveying, preliminary site evaluation or environmental studies.

(3) "Abandonment" means the procedure by which the Board releases all or part of a site from the terms and conditions of a certification previously granted.

(4) "Board" means the Governor and Cabinet sitting as the Siting Board.

(5) "Supplemental Application" means an application for certification for the construction and operation of an additional steam or solar electrical power plant to be located at a site which has been previously certified for an ultimate site capacity.

(6) "Completeness" means the application has addressed all applicable sections of the prescribed application format, but does not mean that said sections are sufficient in comprehensiveness of data or in quality of information provided.

(7) "Secretary" means the Secretary of the Department of Environmental Regulation.

(8) "Sufficiency" means that the sections of the application are sufficient in comprehensiveness of data or in the quality of information provided for the agencies to conduct their required studies in order to assess the impacts of the proposed electrical power plant.

(9) "Clerk of the Siting Board" means the person designated as the clerk of the department for purposes of Florida Rules of Appellate Procedure 9.020(g).

(10) "Major Amendments" means any change in plant design or location of facilities likely to have a significant adverse effect on the environment.

Specific Authority: 403.502, 403.503, F.S. Law Implemented: 403.504(1), 403.517, F.S. History: New 5-7-74, Amended 12-27-77, Formerly 17-17.02, Amended 5-9-83.

17-17.03 Prohibitions and Exceptions.
Specific Authority: 403.504(1), F.S. Law Implemented: 403.506, F.S. History: New 5-7-74, Amended 12-27-77, Transferred to 17-17.031, 5-9-83.

17-17.031 Prohibitions and Exceptions.
No applicant shall construct, suffer, allow or permit construction on any site requiring certification under this Part without an appropriate and currently valid certification issued by the Board pursuant to the requirements of this Part. This section shall not be construed to prohibit the use of the site for agriculture, forestry, mariculture, oil or mineral exploration, or

recreation, which shall be exceptions to the definitions of construction in Section 17-17.021(2) above. Other land uses may be authorized upon a finding by the Board or the Secretary that such uses are not inconsistent with the purposes of the Act. This section shall not obviate the necessity of obtaining appropriate state, regional or local permits, certifications, or similar licenses prior to any use of the site under the above exceptions.
Specific Authority: 403.504(1), F.S.
Law Implemented: 403.506, F.S.
History: New 5-7-74, Amended 12-27-77, Formerly 17-17.03, Amended 5-9-83.

17-17.04 Application for Site Certification, Request for Supplementary Information, Fee.
Specific Authority: 403.502, F.S.
Law Implemented: 403.504, 403.517, F.S. History: New 5-7-74, Amended 12-27-77, Transferred to 17-17.051, 5-9-83.

17-17.041 Notice of Intent.

(1) Any person intending to submit an application for certification may file a Notice of Intent with the Department. If this option is exercised, the Notice shall be filed with the department at least six months prior to the expected date of application in order for the information to be useful.

(2) The Notice of Intent should detail at a minimum:

(a) the type of power plant and proposed size;

(b) the proposed site location together with a general map of the site including the location if known of any proposed associated facilities or transmission line corridors;

(c) a general description of the designated zoning and land use plan for the areas listed in (b);

(d) a list of all state environmental licenses currently held for preapplication work at the site, such as for monitoring facilities;

(e) the anticipated date of filing of the application.

(3) A $2,500 Notice of Intent Fee shall be submitted to the department along with the Notice, for use by the department and other affected agencies in all matters pertaining to the Notice and application. The fee shall be a credit toward the application fee and shall be used, disbursed and refunded in the same manner as the application fee.

(4) Within fifteen days of receipt of a Notice of Intent, the department shall notify all affected agencies and shall publish notice in accordance with Subsection 17-17.151(2).

(5) After publication of notice of the department's receipt of a Notice of Intent from an applicant, the department, other affected agencies, and the applicant may enter into binding written agreements as to the scope, quantity, and specificity of information to be provided in the application, as further described in DER Form 17-1.211(1) FAC. Copies of any public comments concerning the proposed binding agreement shall be forwarded to the appropriate affected agencies and the applicant by the department.

(6) A written agreement proposed by the applicant as to the scope, quantity, and specificity of information to be provided in the application, shall be deemed binding except to the extent an affected agency specifically disagrees within forty-five days of the publication of notice of such a proposal and indicates all changes which are

necessary for the proposed agreement to become acceptable to the agency. All such changes which the applicant agrees to shall be deemed part of the agreement. Any affected agencies' disagreements must be in writing and include the reasons for such disagreements. The Notice of a Proposed Binding Written Agreement may be combined with a Notice of Intent if an applicant has furnished such an agreement to the department with the Notice of Intent.
Specific Authority: 403.504, F.S. Law Implemented: 403.504, 403.5063, F.S. History: New 5-9-83.

17-17.05 Conduct of Studies.
Specific Authority: 403.504(2), F.S. Law Implemented: 403.507(2)(3), F.S. History: New 5-7-74, Amended 12-27-77, Transferred to 17-17.091, 5-9-83.

17-17.051 Application for Site Certification, Fee.

(1) Applications for certification shall follow the format and shall be supported by applicable information and technical studies, as prescribed by DER Form 17-1.211 (1), FAC, Instruction Guide for Certification Applications: Electrical Power Plant Site, Associated Facilities, and Associated Transmission Lines, as amended.

(a) The applicant may substitute the United States Nuclear Regulatory Commission's or its successor's format for an application for a nuclear power plant as outlined in 10 CFR, Part 50 and 10 CFR, Part 51, as amended, or any substantially similar federal format approved by the department, in lieu of the department's format for a new application or a supplemental application.

(b) A separate application shall be made for each expansion in steam or solar electrical generating capacity or new electrical power plant site.

(c) Any supplemental application for certification shall follow the format of and be supported by information and technical studies prescribed by DER Form 17-1.211(1), FAC, or the format described in (1)(a) above. The applicant for supplemental certification should meet with the department to determine what previously filed information is still sufficient for agency use, and what new data must be filed.

(d) Forty-five (45) copies of the certification application or supplemental application and any supplements thereto shall be submitted by the applicant to the department.

(2) The appropriate application fee shall accompany any application and shall be a condition precedent to any further consideration or action on the application by the department beyond that agreed upon as a result of filing a Notice of Intent.

(a) The initial and supplemental application fees shall be in accord with the following:

Type	Initial Fee, $	Supplemental Fee, $
Nuclear	50,000	25,000
Coal fired, 500 MW or larger	40,000	20,000
Coal fired, less than 500 MW	35,000	17,000
Oil fired, 250 MW or larger	30,000	15,000
Oil fired, less than 250 MW	25,000	13,000
Oil fired, 50 MW or less	10,000	5,000
Solar or Solid Waste	25,000	13,000
Gas fired, any size	15,000	8,000

(b) For the purposes of the fee schedule in (2)(a) the fee for a combined cycle unit shall be based on the type of fuel used in the combustion turbine and the total megawattage of the combined cycle units. The fee for modifying a combustion turbine unit to a combined cycle unit shall be calculated on the basis of the additional megawattage, and the type of fuel used.

(3) All fees required of the applicant under this chapter are to be paid into the department's Industrial Siting Trust Fund, and thereafter drawn upon by the department for costs incurred in processing the application pursuant to Subsection 403.504(7), F.S. All such funds so deposited shall be subject to state auditing procedures.

(4)(a) If, at the conclusion of the certification proceedings, it is found that the expenses of the proceedings have exceeded the application fee, the expenses of the department and affected agencies shall be paid from the fee on an equitable basis until the fee is exhausted. Any expenses remaining shall be the responsibility of the agency incurring them.

(b) Any agency intending to incur an expense for a contract for studies under the Act shall first obtain approval from the department for the amount and purpose of such expenditure. The applicant shall be furnished with a copy of any requests for approval of a contract for studies, as submitted by the requesting agency, within 10 days of submission.

(c) It shall be the responsibility of the department to notify the agencies in a timely manner of the total fee charged for the application, amounts committed, and amounts remaining, and to notify the agencies that agencies shall be responsible for any portions of costs which exceed the amount available from the application fee after all costs of the certification proceedings are tabulated.

(d) Expenses for the department and affected agencies shall be reimbursed only at the conclusion of the certification proceedings. Invoices for reimbursement must be submitted within 30 days of the date of certification and must be accompanied by an itemization of the time and expenses incurred. Reimbursement shall occur no sooner than 45 days after certification.

(5) Pursuant to the provisions of Subsection 403.504(13), F.S., the department may withhold from the application fee a reasonable sum sufficient to cover costs associated with postcertification review of activities required by any condition of certification. Such sums shall be specified as part of each condition. Upon completion of any such reviews, any sums remaining shall be refunded to the applicant.

Specific Authority: 403.502, F.S.
Law Implemented: 403.504, 403.517, F.S. History: New 5-7-74, Amended 12-27-77, Formerly 17-17.04, Amended 5-9-83.

17-17.06 Public Notice.

Specific Authority: 403.504(1), F.S.
Law Implemented: 403.504(2)(3)(5), 403.508, 403.517, 403.5065, F.S.
History: New 5-7-74, Amended 12-27-77, Transferred to 17-17.151, 5-9-83.

17-17.061 Hearing Officer Appointment, Duties and Powers.

(1) The department shall request the Division of Administrative

Hearings to appoint a hearing officer to conduct the hearings required by this chapter.

(2) The hearing officer shall have all duties and powers granted to hearing officers by Chapters 120 and 403, Florida Statutes.

(3) The hearing officer may alter any time limitation upon stipulation between the department and the applicant or for good cause shown by any party.

Specific Authority: 403.504(1), F.S. Law Implemented: 403.504(5), 403.508(6), 403.5065, 403.5095, F.S. History: New 5-7-74, Amended 12-27-77, Formerly 17-17.12, Amended 5-9-83.

17-17.07 Evidence of Notice, Additional Notice.

Specific Authority: 403.504(1), F.S. Law Implemented: 403.504(5)(9), 403.508, F.S. History: New 5-7-74, Amended 12-27-77, Transferred to 17-17.161, 5-9-83.

17-17.071 Completeness of Application.

(1) The department shall file, within 10 working days of receipt of an application, a statement with the Division of Administrative Hearings and with the applicant declaring its position with regard to the completeness of the application.

(2) The department shall identify the sections of the application considered to be incomplete and shall present a brief statement as to the reasons for its position.

(3) Within 15 working days of receipt by the department of the application, the applicant shall file with the Division of Administrative Hearings and the department a statement agreeing with the statement of the department and proposing a date by which the information will be supplied, withdrawing the application or contesting the statement of the department and providing information in support of its position.

(4) If the applicant contests the statement of the department and the application is not withdrawn, the hearing officer shall schedule a hearing between the department and the applicant on the statement of completeness as expeditiously as possible, but no later than 30 calendar days after the receipt of the application by the department.

(a) The designated hearing officer shall make his decision within 10 calendar days after the hearing.

(b) The applicant shall withdraw the application if the hearing officer finds it is not complete.

(c) If the hearing officer finds the application was complete at the time it was filed, the times provided in the Act shall run from the date of filing of said application.

Specific Authority: 403.504(1), F.S. Law Implemented: 403.504(3)(5), 403.5065(2), F.S. History: New 10-1-76, Amended 12-27-77, Formerly 17-17.19, Amended 5-9-83.

17-17.08 Hearings Generally-Conduct.

Specific Authority: 403.506, F.S. Law Implemented: 403.504(2)(5), F.S. History: New 5-31-77, Amended 12-27-77, Transferred to 17-17.111, 5-9-83.

17-17.081 Request For Supplementary Information, Determination of Sufficiency of Application - Consultation with Applicant, Procedures.

(1) The applicant shall furnish, at its cost, such information, studies and data as the department,

Department of Community Affairs, Public Service Commission or water management district as defined in Chapter 373, F.S., in whose jurisdiction the proposed electrical power plant is to be located, or their successor agencies, may direct to enable said agencies to conduct their required studies in order to assess the impacts of the proposed electrical power plant and to enable the department to prepare the written analysis provided for in Sections 403.504(8) and 403.507, F.S, subject to the provisions of any binding agreements pursuant to Subsection 17-17.041(6), F.A.C.

(2)(a) Within 45 calendar days after its receipt of an application or within 15 days after its receipt of a major amendment, each agency required to file a report pursuant to Section 403.507, F.S., shall inform the department of its position regarding sufficiency of the application, and what additional information may be necessary to make it sufficient.

(b) Should the department, in consultation with the agencies required to file a report pursuant to Section 403.507, F.S., determine that an application is not sufficient within 45 days after initiation of the studies required by Section 403.507(3), F.S., or within 15 days after the filing of any major amendments, the department shall so inform the applicant and the hearing officer. Within 15 days of being so informed the applicant shall consult with the department to determine if the insufficiency can or will be timely rectified.

1. Where the applicant intends to correct the insufficiency, the applicant shall file with the Division of Administrative Hearings, the department, and other parties, a statement accepting the statement of the department and proposing a date by which the information will be supplied. If the proposed date indicates that the insufficiency cannot be rectified according to the following time limitations, within 15 days of being so advised, the hearing officer shall schedule a hearing on this issue. The hearing shall be no later than 30 days after the receipt of the department's position on sufficiency. The hearing officer shall make a decision on this issue within 10 days after the hearing.

a. If the insufficiency cannot be corrected at least 30 days prior to the filing of a final agency report for those matters pertaining to an agency other than the department, subject to Subsection (4) below, the insufficiency shall be considered good cause for alteration of the date for filing that agency's final report. The date for filing the department's report shall be adjusted to allow receipt of another agency's final report at least 21 days prior to the issuance of the department's report.

b. If the insufficiency cannot be corrected at least 60 days prior to the filing of the department's report, subject to Subsection (4) below, the insufficiency shall be considered good cause for adjustment of the date for filing the department's report.

2. If the applicant contests the statement of the department on sufficiency, the applicant shall advise the hearing officer and other parties. Within 15 days of being so advised the hearing officer shall schedule a hearing on this issue. The hearing shall be no later than 30 days after the receipt of the

department's position. The hearing officer shall make a decision on this issue within 10 days of the hearing. If the hearing officer determines that the application is insufficient, then the applicant shall correct this deficiency, and subject to Subsection (4) below, the time limits shall be adjusted accordingly. If the hearing officer determines that the application is sufficient, then the times provided in this Part shall run from the date of filing the application.

3. Within 15 days after receipt of any additional information required to correct an insufficiency, the affected agencies shall review it and may request only that information needed to clarify such additional information or to answer new questions raised by or directly related to such additional information. If the applicant believes the request of the affected agencies for such additional information is not authorized by law or rule, the provisions of Section 17-17.081(2)(b)2. shall apply.

(3) Information required to make the application sufficient must be submitted and found sufficient at least 120 days prior to the certification hearing, unless otherwise provided for by agreement.

(4) Late or insufficient submittals of information required pursuant to the other provisions of this Section shall be good cause for continuance of the hearing unless the hearing officer makes specific findings entered in the record of the proceeding that a continuance is unnecessary.

Specific Authority: 403.504(1), F.S. Law Implemented: 403.504(2)(3), F.S. History: New 5-7-74, Amended 12-27-77, Formerly 17-17.04(2) and 17-17.20, Amended 5-9-83.

17-17.09 Land Use Hearings-Subject Matter, Effect of Findings. Specific Authority: 403.504(1)(2), F.S. Law Implemented: 403.504(5), 403.508, F.S. History: New 5-7-74, Amended 12-27-77, Transferred to 17-17.121, 5-9-83.

17-17.091 Conduct of Studies.

(1) As needed to verify or supplement the studies made by the applicant in support of the application, the department within 30 days of the filing of a complete application shall commence or contract for joint or independent studies to aid in the evaluation of the site or may request that other agencies prepare a report on the matters listed in Subsection (2) below as they may pertain to that agency's jurisdiction. The department shall give written notice of all such studies to the applicant before they are commenced.

(2) Such studies shall include, but shall not be limited to, the consideration of the following criteria:

(a) Cooling system requirements for maximum proposed steam or solar electrical generating capacity;

(b) Technical sufficiency of proposed construction and operational safeguards for the protection of human health, wildlife, and aquatic life;

(c) Proximity to navigable water and other transportation systems and the expected impact on such systems;

(d) Soil and foundation conditions;

(e) Impact on suitable present and projected water supplies for this and other competing uses;

(f) Impact on surrounding land uses and population density;

(g) Accessibility to transmission corridors, both existing and proposed, and impacts from construction and maintenance of any new transmission lines, access roads, and rights-of-way;

(h) Environmental impacts of maximum proposed steam or solar electrical generating capacity;

(i) Impact on air quality and water quality of maximum proposed steam or solar electrical generating capacity;

(j) Site specific studies due to the particular nature of the site;

(k) Impact on public lands, and submerged lands;

(l) Impact on terrestrial and aquatic plant and animal life, with special emphasis on endangered or threatened species;

(m) Impact on known archaeological sites and historic preservation areas.

(3) Additional studies shall be approved by the Secretary and shall be in conformance with all provisions of this chapter.

Specific Authority: 403.504(2), F.S. Law Implemented: 403.507(2)(3), F.S. History: New 5-7-74, Amended 12-27-77, Formerly 17-17.05, Amended 5-9-83.

17-17.10 Appeal from Denial of Rezoning or Variance from Local Zoning or Land Use Plans, Hearing, Board Action.

Specific Authority: 403.504(1), F.S. Law Implemented: 403.504(5)(7), 403.508(2), F.S. History: New 5-7-74, Amended 12-27-77, Transferred to 17-17.131, 5-9-83.

17-17.101 Analysis by the Department.

Upon satisfactory compliance by the applicant with the Act and this chapter and completion of processing by the department, the department shall file the written analysis required by 403.504(8), F.S., with the hearing officer and shall serve it on all parties no later than eight (8) months after the complete application is filed with the department, and no later than 30 days prior to the certification hearing.

Specific Authority: 403.504(1)(8), F.S. Law Implemented: 403.509, F.S. History: New 5-7-74, Amended 12-27-77, Formerly 17-17.14(1), Amended 5-9-83.

17-17.11 Certification Hearings-Subject Matter, Procedure, Participants.

Specific Authority: 403.504(1), F.S. Law Implemented: 403.504(5), 403.508(3)(4)(5), F.S. History: New 10-1-76, Amended 12-27-77, Transferred to 17-17.141, 5-9-83.

17-17.111 Hearings Generally - Conduct.

All hearings pursuant to the Act and this chapter shall be conducted according to the procedural provisions of Chapter 17-1, Part II, FAC, and Chapter 120, Florida Statutes. If there is any conflict or question of applicability between Chapter 17-1, Part II, FAC, and Chapter 17-17, FAC, or Chapter 120, F.S., and Chapter 403, Part II, F.S., then the latter statutes or rule shall govern the proceedings.

Specific Authority: 403.506, F.S. Law Implemented: 403.504(2)(5), F.S. History: New 5-31-77, Amended 12-27-77, Formerly 17-17.08, Amended 5-9-83.

17-17.12 Hearing Officer Appointment, Duties and Powers.
Specific Authority: 403.504(1), F.S. Law Implemented: 403.504(5), 403.508(6), 403.5065, 403.5095, F.S. History: New 5-7-74, Amended 12-27-77, Transferred to 17-17.061, 5-9-83.

17-17.121 Land Use and Zoning Hearings - Subject Matter, Effect of Findings.

(1) A land use and zoning hearing shall be held within ninety (90) days of receipt of a complete application in a convenient public location as close as possible to the site.

(2) The sole issue of the land use and zoning hearing shall be to determine whether or not the use of the site is consistent with and in compliance with applicable land use plans and zoning ordinances.

(3)(a) At the time the application is filed, the applicant shall submit to the department three copies of a compilation of information specifying the procedures taken to accomplish compliance of the site, including associated facilities and directly associated transmission lines, with existing land use plans and zoning ordinances. Such compilation shall include copies of the applicable portions of ordinances, regulations, or land use plans involved. Within 15 days of receipt, the department shall file one copy with the hearing officer and one copy with the Department of Community Affairs.

(b) Copies of the compilation required under (a) above shall be made available for public inspection and copying during normal business hours at the main and local business offices of the applicant and at the appropriate offices of the department.

(4) The hearing officer shall submit a recommended order on the land use and zoning hearing to the Board no later than thirty (30) days after completion of the hearing.

(5) Upon a finding by the Board that the site is consistent and in compliance with land use plans and zoning ordinances in effect at the date of application filing, the responsible zoning or planning agency shall not thereafter change or apply such land use plans and zoning ordinances so as to impair or prevent the proposed use of the site unless certification of the site is subsequently denied or revoked, or the site is abandoned.

(6) Upon a finding by the Board that the site is inconsistent or not in compliance with existing land use plans and zoning ordinances, the Board may continue the land use and zoning hearing to a future date in order to allow the applicant to apply to the responsible zoning or planning authority for rezoning or change in land use.
Specific Authority: 403.504(1)(2), F.S. Law Implemented: 403.504(5), 403.508, F.S. History: New 5-7-74, Amended 12-27-77, Formerly 17-17.09, Amended 5-9-83.

17-17.13 Post Certification Monitoring.
Specific Authority: 403.504(1), F.S. Law Implemented: 403.504(10), F.S. History: New 5-7-74, Amended 12-27-77, Transferred to 17-17.191, 5-9-83.

17-17.131 Appeal from Denial of Rezoning or Variance from Local Zoning or Amendment of Land Use Plans, Hearing, Board Action.

(1) Upon denial of an application for rezoning or variance from an existing zoning ordinance or from denial of an amendment to a land use plan by a local agency, the applicant may make a written appeal to the Board which shall include:

(a) The record of any land use and zoning hearings before the hearing officer dealing with the matter;

(b) The record of applicant's hearing(s) before the local zoning or land use agency;

(c) A statement of steps taken by the applicant in seeking the rezoning or change in or amendment of a land use plan and the results therefrom.

(2) Upon the issuance by the Board of a final order denying a variance, no further action may be taken on the complete application by the department until the proposed site conforms to existing land use plans or zoning ordinances and the department shall stop all studies and reports in progress and notify all parties that action on the application is stopped.

Specific Authority: 403.504(1), F.S. Law Implemented: 403.504(5)(7), 403.508(2), F.S. History: New 5-7-74, Amended 12-27-77, Formerly 17-17.10, Amended 5-9-83.

17-17.14 Analysis by the Department, Abandonment.

Specific Authority: 403.504(1)(8), F.S. Law Implemented: 403.509, F.S. History: New 5-7-74, Amended 12-27-77, Transferred to 17-17.101 and 17-17.241, 5-9-83.

17-17.141 Certification Hearings - Subject Matter, Procedure, Participants.

(1) Subsequent to the land use and zoning hearing, the department shall arrange with the hearing officer for a certification hearing to be held no later than 10 months after the filing of a complete application with the department.

(2) The certification hearing shall include recognition of the Public Service Commission's determination of the necessity of expanded electrical generation pursuant to Section 403.519, F.S., an examination of the expected environmental impact resulting from the construction and operation of the facilities, the standards of the agencies, operational safeguards, other public interests and any issues made applicable by law in consideration of the site.

(a) The applicant for certification shall make formal presentation of its proposal at the certification hearing and shall address each of the topics listed in (2) above.

(b) All parties may present their respective cases in accordance with the rules of evidence in administrative proceedings at the hearing. These presentations may include the application and all studies, reports, and analyses prepared in accordance with the Act and this chapter. Except for the determination of need pursuant to Section 403.519, F.S., the introduction of such applications, studies, reports and analyses shall not go to the truth or veracity of the statements therein.

(c) The parties are encouraged

to design their presentations to inform the public of the details of the proposed power plant, but the question of compliance with this paragraph shall not be the basis for review.

(d) Each party shall make available for public inspection at least five days prior to the hearing at a place specified in the public notice any written direct testimony which it intends to submit at the hearing. Failure to comply with this requirement shall preclude the use of such written testimony at the hearing and shall not delay the hearing. Any persons not a party may present testimony, reports or evidence in accordance with Chapter 120, F.S., and this chapter, but such direct testimony, if written, must be furnished to all parties at least five days prior to the hearing in order to be used. If the hearing officer proposes to consider testimony of a non-party, the parties shall be given an opportunity for cross-examination and rebuttal.

(e) Where the applicant seeks a condition in its certification which constitutes a variance from the non-procedural standards or regulations of the department or from the standards or regulations of any other agency, the applicant shall notify all parties and the hearing officer at least 120 days prior to the certification hearing of the standards or regulations it seeks a variance from, the reasons for such variance, the notice given to the agency whose rules are involved, and the condition which it seeks to have included in the certification on this issue.

(f) Where the applicant seeks to use, connect to, or cross over any properties or works of any agency, the applicant shall notify all parties and the hearing officer of this issue at least 120 days prior to the certification hearing. This activity shall be an issue addressed in the certification hearing unless waived in writing by the agency involved.

(g) Parties who are granted permission for untimely intervention pursuant to Subsection 403.508 (4)(c), F.S., shall be bound by the status of the proceedings as they find them as of the date intervention is granted, unless otherwise ordered by the hearing officer in his discretion.

(h) The parties may address in any proposed recommended order and the recommended order of the hearing officer shall address the balance between the need for the power plant as determined pursuant to Section 403.519, F.S., and the environmental impact of the facilities.

Specific Authority: 403.504(1), F.S. Law Implemented: 403.504(5), 403.508(3)(4)(5), F.S. History: New 10-1-76, Amended 12-27-77, Formerly 17-17.11, Amended 5-9-83.

17-17.15 Retention and Availability of Certification and Application, Copying Fees.
Specific Authority: 403.504(1), F.S. Law Implemented: 403.515, F.S. History: New 5-7-74, Amended 12-27-77, Transferred to 17-17.181, 5-9-83.

17-17.151 Public Notice.

(1) The department shall provide for publication of any public notice. Each notice should clearly describe a point of entry for persons whose substantial interests are affected or determined by the proceeding by providing:

(a) The time frame in which the

person must petition or file a notice of intent to become a party;

(b) Reference to the particular rules applicable to becoming a party; and

(c) A statement advising that failure to act within the time frame constitutes a waiver of the right to become a party.

(2) Notice of Intent to File an Application.

(a) Within fifteen days of receipt of a Notice of Intent, the department shall publish a public notice in a newspaper(s) of general circulation in the county or counties in which the site is to be located. The public notice shall bear a two-column heading in bold letters: "Notice of Intent to File Application for Power Plant Site Certification".

(b) The public notice shall contain at least the following information:

1. The name and a brief description of the site, including type and capacity of the power plant;

2. A map showing the location of the proposed site;

3. A list of readily accessible public places where copies of the Notice of Intent are available for public inspection and copying at cost. The list shall include the addresses of the Tallahassee office of the department and the department's district office serving the site for the proposed power plant together with any other appropriate public office(s) near the proposed site as selected by the department;

4. A statement that a Notice of Intent to seek certification to authorize construction and operation of an electrical power plant near (location), Florida, has been received by the Department of Environmental Regulation pursuant to the Florida Electrical Power Plant Siting Act, Chapter 403, Part II, Florida Statutes;

5. The statement "The department and other affected agencies are authorized by Section 403.5063(2), F.S., to enter into binding written agreements with (name of the utility) regarding the scope, quantity, and level of information to be provided in the application for certification which will be subsequently filed. The public may provide comments regarding the substance of such agreements. These comments should be addressed to the Administrator, Power Plant Siting, Department of Environmental Regulation";

6. Where the application for certification will be accompanied by an applicant's federal coastal zone consistency determination as required by the Coastal Zone Management Act, the following statement shall be included: "This Public Notice is also provided in compliance with the federal Coastal Zone Management Act, as specified in 15 CFR Part 930, Subpart D. Public comments on the applicant's federal consistency certification should be directed to the Federal Consistency Coordinator, Division of Environmental Permitting, Department of Environmental Regulation."

(c) The department shall publish an appropriate notice of receipt in the Florida Administrative Weekly.

(d) This notice may be combined with the Notice of Binding Agreement, where appropriate.

(3) Notice of Binding Agreement.

Within 15 days of receipt of a proposed written agreement on the scope, quantity, and specificity of the information to be provided in the application, public notice shall be provided to the affected agencies and in a newspaper(s) of general circulation in the county or counties in which the site is to be located, and shall consist of the following:

(a) The name and a brief description of the site, including type and capacity of the power plant;

(b) A list of places where the proposed agreements are available for public inspection;

(c) The statement "The department and other affected agencies are authorized by Section 403.5063(2), F.S., to enter into binding written agreements with (name of the utility) regarding the scope, quantity, and level of information to be provided in the application for certification which will subsequently be filed. The public may provide comments regarding the substance of such an agreement to the Administrator of Power Plant Siting, Department of Environmental Regulation, 2600 Blair Stone Road, Tallahassee, Florida, 32301, within 45 days of the publication of the notice";

(d) A statement that any disagreements must be submitted by an affected agency to the department and the applicant within 45 days of the publication of the notice.

(4) Notice of Land Use and Zoning Hearing.

At least forty-five (45) days prior to the public hearing on the land use and zoning, public notice shall be provided which shall consist of the following:

(a) Publication in a newspaper of general circulation in the county or counties in which the site is located and in a newspaper or newspapers of general circulation, as selected by the department, of a public notice which shall occupy not less than one-half (1/2) of the newspaper page, bearing the heading "Notice of Land Use and Zoning Hearing on Proposed Power Plant Facility", in bold letters not less than three fourths (3/4) inches high. The public notice shall contain the following information:

1. The name and brief description of the site, including type and capacity.

2. A map showing the location of the site, and of any associated facilities or transmission line corridor study areas.

3. A list of readily accessible public places where copies of the application are available for public inspection and copying. The list shall include the addresses of the main and local regional offices of the department serving the site, general business office of the applicant, and the local business office of the applicant serving the site.

4. A statement that: "Application Number ______ for certification to authorize construction and operation of an electrical power plant near _____, Florida, is now pending before the Department of Environmental Regulation, pursuant to the Florida Electrical Power Plant Siting Act, Chapter 403, Part II, Florida Statutes".

5. A statement that: "Pursuant to Section 403.508, Florida Statutes, the land use and zoning public hearing will be held by the Division of Administrative Hearings on _____, 19__, at ____, in ____ County, Florida, at _____m. to determine whether or not the site is consistent and in

compliance with existing land use plans and zoning ordinances. No other issues will be heard at this land use and zoning hearing. A subsequent public hearing upon the application will be held to consider environmental and other impacts prior to final action by the Governor and Cabinet".

6. Sections 403.508(4) and 403.508(5), Florida Statutes, in their entirety.

(b) The department mailing by certified mail, return receipt requested within ten (10) days of publication of the notice required by (4)(a), a copy of said public notice to the chief executive of any local or regional authority having responsibility for zoning or land use planning whose jurisdiction includes the site.

(c) The applicant posting a copy of the public notice required by (4)(a) at the site.

(d) A news release shall be sent by the department to appropriate media as selected by the department.

(e) Publication of an appropriate notice of the hearing in the Florida Administrative Weekly.

(5) Notice of Zoning and Land Use Plan Appeal Hearing.

If the applicant intends to appeal to the Board for a variance, pursuant to Section 403.508(2), F.S., because the proposed site is not in compliance with existing land use plans or zoning ordinances and the application for rezoning or for change or amendment of the land use plan has been denied, public notice shall be provided which shall consist of the following:

(a) Publication of Notice which complies with all the requirements of subsection (4)(a) above, except that:

1. The notice shall be published at least 30 days prior to the zoning or land use plan appeal hearing before the Board;

2. The heading of the notice shall read:

"Notice of Hearing Before the Governor and Cabinet to Determine Whether it is in the Public Interest to Authorize a Nonconforming Use of Land in ____ County (or city) as a Site for an Electrical Power Plant."

3. The following statement shall be included in lieu of (4)(a) 5. and 6.:

"Pursuant to Section 403.508, F.S., a zoning appeal or land use plan appeal hearing will be held before the Board on _____, 19__, at _____, in _____ County, Florida at _____m. An Application for rezoning or change or amendment of the existing land use plan has been denied and, upon a finding that it is in the public interest to authorize a nonconforming use of the land as a site for an electrical power plant at this hearing, the Governor and Cabinet are empowered to authorize a nonconforming use or variance. If such a change in land use is granted the responsible zoning or planning authority shall not thereafter change or apply such land use plans or zoning ordinances so as to impair or prevent the proposed use of the site unless certification of the site is subsequently denied."

4. Identification of the land use plans or zoning ordinance which are the subject of the appeal.

(b) The department mailing by certified mail, return receipt requested within ten (10) days of publication, a copy of the public notice required by (5)(a) to the chief executive of any local or regional authority having responsibility for zoning or land use planning, whose jurisdiction includes the site.

(c) Publication of an appropriate notice in the Florida Administrative Weekly.

(6) Notice of Certification Hearing.

At least thirty (30) days prior to any certification hearing, public notice shall be provided consisting of the following:

(a) Publication in a newspaper of general circulation in the county or counties in which the site is located and in a newspaper or newspapers of general circulation, as selected by the department, of a public notice which shall occupy not less than one-half (1/2) of the newspaper page, bearing the heading, "Notice of Certification Hearing on an Application to Construct and Operate an Electrical Power Plant on a Site to be located near ______, Florida". The heading shall be in bold letters not less than three-fourths (3/4) inches high. The public notice shall contain the following information:

1. The name and brief description of the site including type and capacity;

2. A map showing the location of the site and of any associated facilities or transmission line corridor study areas;

3. A list of readily accessible public places where copies of the application are available for public inspection and copying, including the nearest office of the department to the site. The list shall include the addresses of the main and the local regional offices of the department, general business office of the applicant and the local business office of the applicant nearest to the site;

4. A statement that: "Application Number _____ for certification to authorize construction and operation of an electrical power plant near ______, Florida," (and where applicable: "and associated transmission lines from ____ to ____") "is now pending before the Department of Environmental Regulation pursuant to the Florida Electrical Power Plant Siting Act, Chapter 403, Part II, F.S.";

5. A statement that: "Pursuant to Section 403.508, Florida Statutes, the certification hearing will be held by the Division of Administrative Hearings on ______, 19 __, at _______, in (county), Florida, at _____m. in order to take written or oral testimony on the effects of the proposed electrical power plant or any other matter appropriate to the consideration of the site. Need for the facility has been predetermined by the Public Service Commission at a separate hearing. Written comments may be sent to ____ (Hearing Officer) at ____ (Address) on or before ____ (date).";

6. Section 403.508(4) and (5), F.S., in their entirety;

7. A statement that: "Those wishing to intervene in these proceedings must be represented by an attorney or other person who can be determined to be qualified to appear in administrative proceedings pursuant to Chapter 120, F.S., or Chapter 17-1.21, FAC.";

8. A statement indicating where the written reports and testimony will be available for public inspection at least five days prior to the hearing;

9. Where applicable, the department shall advertise the

applicant's intention to use, connect to or cross over properties and works of governmental agencies. The following statement shall be included in notices published pursuant to (6)(a), "Pursuant to Section 403.509(2), F.S., (Name of Utility) intends to use, connect to, or cross over properties and works of the following agencies: ________________

_________________________.

"The hearing officer will receive comments and testimony from the parties, the public and the affected agencies at the certification hearing.";

10. Where applicable, the department shall advertise the applicant's desire to obtain a condition of certification that would constitute a variance from a non-procedural standard or regulation of the department or a standard or regulation of any other agency. The department shall include an appropriate statement in notices published pursuant to (6)(a) such as: "Pursuant to Section 403.511(2), F.S., (Name of Utility) seeks a variance from (Rule, Agency) for the purpose of ______________.

The hearing officer will receive comments and testimony on the variance request from the parties, the public and the affected agencies at the certification hearing.";

11. Where applicable, the department shall include a statement indicating that the proposed transmission line corridor may be certified anywhere within the study area shown on the map and not necessarily in the locations shown as the proposed route;

12. Where the application for certification will be accompanied by an applicant's federal coastal zone consistency determination as required by the Coastal Zone Management Act, the following statement shall be included: "This Public Notice is also provided in compliance with the federal Coastal Zone Management Act, as specified in 15 CFR Part 930, Subpart D. Public comments on the applicant's federal consistency certification should be directed to the Federal Consistency Coordinator, Division of Environmental Permitting, Department of Environmental Regulation."

(b) A news release of the information described by (6)(a) shall be sent to appropriate media by the department.

(c) Publication of appropriate notice in the Florida Administrative Weekly.

(7) Notice on Completeness Hearing.

Notice of a hearing on the completeness of an application shall be provided by the department in the Florida Administrative Weekly.

(8) Notice of Receipt of a Supplemental Application.

The Department shall provide notice of the receipt of a supplemental application consisting of:

(a) Publication in a newspaper of general circulation in the county or counties in which the site is located and in a newspaper or newspapers of general circulation, as selected by the department, of a public notice shall occupy not less than one-half (1/2) of the newspaper page, bearing the heading, "Notice of Application for Construction and Operation of an Addition to the Power Plant Facility Located Near ______, Florida", in bold letters not less than three fourths (3/4) inches high.

(b) The public notice shall contain the following information:

1. The name and brief description of the site, including type and capacity;

2. A map showing the location of the site;

3. A list of readily accessible public places where copies of the application are available for public inspection and copying, including the nearest office of the department to the site. The list shall include the addresses of the main and the local regional offices of the department, general business office of the applicant, and the local business office of the applicant nearest to the site;

4. A statement that: "A supplemental application numbered ____ for certification to authorize construction and operation of an additional electrical power plant near ______, Florida, is now pending before the Department of Environmental Regulation, pursuant to the Florida Electrical Power Plant Siting Act, Chapter 403, Part II, F.S."

5. A statement that: "The department expects to hold a public hearing on the effects of the construction and operation of an additional electrical power generating unit that would be located on the previously certified site, within 150 days. All persons wishing to become parties to the proceedings should file a notice of intent to become a party with the department by (insert date)."

(c) By a news release sent to the news media by the department.

(d) By publication of appropriate notice in the Florida Administrative Weekly.

(9) Notice of Hearing on Supplemental Application.

A notice of hearing on the supplemental application shall follow the procedure prescribed by either Subsection (6) or (7) above, as applicable, and said notice shall be modified by the department to clearly indicate the purpose of the hearing.

(10) Notice of Modification Request.

The department shall provide notice of receipt of a modification request by publishing notice in the Administrative Weekly and by sending notice to the last address of each party to the original certification proceedings as shown in the record of that proceeding. At its discretion, the department may also publish notice in newspaper(s) of general circulation in the county or counties in which the site is located dependent upon the scope or type of modification requested.

(11) Notice of Hearing on a Modification Petition Pursuant to Subsection 403.516(3), F.S.

The department shall provide notice of the hearing scheduled on a modification petition filed pursuant to Subsection 403.516(3), F.S., consisting of publication of the appropriate notice in the Florida Administrative Weekly and by filing a copy of such notice with all parties.

Specific Authority: 403.504(1), F.S.
Law Implemented: 403.504(2)(3)(5), 403.508, 403.517, 403.5065, F.S.
History: New 5-7-74, Amended 12-27-77, Formerly 17-17.06, Amended 5-9-83.

17-17.16 Review and Evaluation.
Specific Authority: 403.504(1), F.S. Law Implemented: 403.512, 403.514, F.S. History: New 5-7-74, Amended 12-27-77, Transferred to 17-17.201, 5-9-83.

17-17.161 Evidence of Notice, Additional Notice.

(1) Evidence of any notice made pursuant to this chapter, together with a copy of the notice, shall be filed with the hearing officer and all parties within ten (10) days of issuance or publication of said notice.

(2) Inadvertent failure of service on, or notice to the public or any of the persons entitled to receive such service pursuant to provisions of this chapter may be cured by an order of the hearing officer designed to afford the public or such persons adequate notice to enable their effective participation in the proceeding.

(3) The hearing officer may, at any time, require the department to serve or publish additional notices of hearing and file evidence thereof.

Specific Authority: 403.504(1), F.S. Law Implemented: 403.504(5)(9), 403.508, F.S. History: New 5-7-74, Amended 12-27-77, Formerly 17-17.07, Amended 5-9-83.

17-17.17 Modification of Certification.

Specific Authority: 403.504(1), F.S. Law Implemented: 403.516, 403.511(5), F.S. History: New 5-7-74, Amended 12-27-77, Transferred to 17-17.211, 5-9-83.

17-17.171 Conditions of Certification.

In order to facilitate compliance with Section 403.511(5)(b), F.S., all criteria required by the terms and conditions of the certification which are site-specific shall be identified. Those terms and conditions in the certification which result from the direct application of general agency standards to the facts shall not be deemed site-specific unless the applicability of such standard is a matter of administrative discretion.

Specific Authority: 403.504(1), F.S. Law Implemented: 403.511(5)(b), F.S. History: New 5-9-83.

17-17.18 Revocation or Suspension of Certification.

Specific Authority: 403.504(1), F.S. Law Implemented: 403.512, F.S. History: New 5-7-74, Amended 12-27-77, Transferred to 17-17.221, 5-9-83.

17-17.181 Retention and Availability of Certification and Application, Copying Fees.

(1) The applicant shall at all times retain complete copies of the application and certification at the central business office and the business office serving the site. Applicant's copies of the application and certification shall be open for public inspection and copying during normal business hours.

(2) The department shall retain complete copies of the application and certification at the main office and the local district office for the district in which the certified facility is located, which shall be open for public inspection and copying during normal business hours.

(3) A reasonable fee may be charged for providing copies pursuant to this chapter.

Specific Authority: 403.504(1), F.S. Law Implemented: 403.515, F.S. History: New 5-7-74, Amended 12-27-77, Formerly 17-17.15, Transferred 5-9-83.

17-17.19 Completeness of Application.
Specific Authority: 403.504(1), F.S. Law Implemented: 403.504(3)(5), 403.5065(2), F.S. History: New 10-1-76, Amended 12-27-77, Transferred to 17-17.071, 5-9-83.

17-17.191 Post Certification Monitoring.

(1) The applicant shall conduct at no expense to the department post-certification monitoring, as deemed reasonable by the Board, of the environmental effects arising from construction and operation of the applicant's electrical power plant, in order to assure continued compliance with the terms and conditions of certification. The monitoring shall be carried out in the manner prescribed in the conditions of certification and may include an evaluation of:

(a) Geological information developed during construction.

(b) Environmental effects of air and water contamination.

(c) Radiation hazards and contamination from nuclear or other power plants.

(d) Meteorological conditions.

(e) Hydrology, including surface runoff, water use and consumption.

(f) Ecological effects of construction and operation.

(g) Impact of the construction and operation of the plant on animal and plant life, fish and other aquatic life.

(h) Archaeological or historical site deposits invaded or disturbed during construction excavation.

(i) Noise levels at the site boundary or within adjacent residential areas.

Specific Authority: 403.504(1), F.S. Law Implemented: 403.504(10), F.S. History: New 5-7-74, Amended 12-27-77, Formerly 17-17.13, Amended 5-9-83.

17-17.20 Determination of Insufficiency of Application, Consultation with Applicant, Procedures.
Specific Authority: 403.504(1), F.S. Law Implemented: 403.504(2)(3), F.S. History: New 5-7-74, Amended 12-27-77, Transferred to 17-17.081, 5-9-83.

17-17.201 Review and Evaluation.
The department may, at any time, review the certification and evaluate the compliance of the applicant with the terms and conditions contained therein and act upon such review and evaluation as it deems appropriate, in accordance with the provisions of the Act and this chapter.
Specific Authority: 403.504(1), F.S. Law Implemented: 403.512, 403.514, F.S. History: New 5-7-74, Amended 12-27-77, Formerly 17-17.16, Transferred 5-9-83.

17-17.21 Processing of Supplemental Application.
Specific Authority: 403.504(1)(6)(9), F.S. Law Implemented: 403.5065, 403.507, 403.517, F.S. History: New 5-7-77, Amended 12-27-77, Transferred to 17-17.231, 5-9-83.

17-17.211 Modification of Certification, Fee.

(1) A certification and conditions of certification can be modified only in accordance with Section 403.516, F.S., and this rule. Any request for modification shall be accompanied by 14 copies of the appropriate alterations of the

original application.

(2) A request for modification is made and a modification proceeding initiated by the filing of a petition pursuant to Subsection 17-17.211(3), F.A.C, or by the filing of a proposed agreement pursuant to Subsection 17-17.211(4), F.A.C. Petitions for modification pursuant to Subsection 403.516(3), F.S., shall be filed with the Division of Administrative Hearings. Proposed agreements and other petitions shall be filed with the department in accordance with Section 17-1.25, F.A.C.

(3) Modification of a certification or a condition of certification may be requested by filing a petition. The petition shall contain the following information:

(a) A description of the Petitioner;

(b) A concise statement of the ultimate facts, including changes in circumstance which justify the modification, as well as the rules and statutes which entitle the petitioner to relief;

(c) A brief statement of whether, and if so, how so, a proposed modification if granted would affect the Application as modified by the final order of certification, the conditions of certification, Findings of Fact or Conclusions of Law, and studies conducted pursuant to Section 17-17.05, F.A.C., upon which the certification or conditions of certification were based;

(d) A demand for relief to which the petitioner deems himself entitled; and

(e) Other information which the petitioner contends is material.

(4) A modification may be requested by filing with the department and by sending notice to each party to the original certification proceedings at its last address as shown on the record of such proceeding a proposed agreement to modify the terms and conditions of certification in accordance with Subsection 403.516(2), F.S.

(a) Parties shall respond to the proposed agreement within forty-five days of the filing of the proposed agreement. Failure to file a timely response shall be deemed acceptance of the proposed agreement.

(b) If any dispute arises concerning the proposed agreement, the proposed agreement may be treated as a petition pursuant to Subsection 17-17.211(3), F.A.C.

(5) Unless the department has been delegated the authority to issue the modification, a modification shall not become effective until approved by the Board.

(6) Administrative Res Judicata applies to petitions for modification.

(7) If a modification becomes subject to the provisions of Subsection 403.516(3), F.S., the petitioner for the modification shall submit a $5000 modification fee to the department, unless waived for good cause or reduced by the department. Any sums remaining after payment of authorized costs shall be refunded to the petitioner within 90 days of approval or denial of modification by the board, or withdrawal of the modification.

(8) Upon receipt of a request to modify certification, the department shall issue notice as prescribed in Section 17-17.151, F.A.C.

(9) If any holder of a certification pursuant to this Part chooses to operate the certified electrical power plant in compliance with any rules subsequently adopted by the

department which prescribe criteria more lenient than the criteria required by the terms and conditions in the certification which are not site specific, the certification holder shall notify the department prior to modifying its method of operation.
Specific Authority: 403.504(1), F.S. Law Implemented: 403.516, 403.511(5), F.S. History: New 5-7-74, Amended 12-27-77, Formerly 17-17.17, Amended 5-9-83.

17-17.221 Revocation or Suspension of Certification.

(1) Any material false statement, noncompliance with terms or conditions of a certification or violation of Chapter 403 or regulations or orders issued thereunder shall be grounds for revocation or suspension of certification.

(2) The department shall initiate a public hearing for revocation or suspension of certification and notify the applicant, pursuant to the provisions of Chapter 120, F.S.

(3) The applicant, upon receiving such notification, and after preliminary hearing shall immediately terminate all activities that were alleged to be in violation of the certification under this chapter and the Act, if so ordered by the hearing officer, pending final resolution of the revocation or suspension proceedings.

(4) The above sections shall not be interpreted as requiring the termination of environmental studies or monitoring by the department or the applicant. The department may terminate, at its discretion, such activities by written notice to the persons conducting such activities, and to the parties to the certification hearing.

(5) The department may, at its discretion, cause to be conducted any investigations, monitoring or studies deemed appropriate in contemplation or in pursuance of suspension or revocation proceedings.
Specific Authority: 403.504(1), F.S. Law Implemented: 403.512, F.S. History: New 5-7-74, Amended 12-27-77, Formerly 17-17.18, Transferred 5-9-83.

17-17.231 Processing of Supplemental Application.

(1) A supplemental application shall be submitted in the format provided for by Section 17-17.051.

(2) The department shall issue notice of the filing of a supplemental application in accordance with Subsection 17-17.151(8), to the public and affected agencies and all parties to the original certification proceedings by certified mail within 15 days of receipt of the supplemental application by the department. The parties to a supplemental proceeding shall include as a minimum those parties specified in Section 403.508(4)(a), F.S.

(3) Parties to the original certification proceedings may become parties to the supplemental certification proceedings by filing a notice of intent to become a party with the department within thirty (30) days of the publication of the notice required by (2) of this section. Subsection 403.508(4) shall act as a guide for any other agency or person in becoming a party.

(4) The department shall request assignment of a hearing officer within 7 days of receipt of a supplemental application by the department.

(5) The department shall file a statement with the Division of

Administrative Hearings and the applicant as to the completeness of the application within 10 working days of receipt of the supplemental application by the department.

(6) The applicant shall file with the Division of Administrative Hearings and the department a response to the department's finding on completeness within 15 working days of receipt of the supplemental application by the department and shall request a hearing if desired.

(7) The hearing on completeness shall be held within 30 days of receipt of the application by the department and a decision rendered within 10 days of completion of the hearing.

(8) The Public Service Commission, Department of Community Affairs, and the water management district as defined in Chapter 373, F.S., in whose jurisdiction the proposed electrical power plant is to be located, or their successor agency, shall each submit a copy of its report on the supplemental application to the department within 75 days of receipt of the complete supplemental application by the department.

(9) The department shall complete the studies required by Section 17-17.091 within 120 days of receipt of the complete supplemental application by the department.

(10) The department shall arrange to have a public notice published pursuant to Subsection 17-17.151(6) within 110 days of receipt of the complete supplemental application by the department.

(11) The hearing officer shall hold a certification hearing on the proposed unit not later than 155 days after receipt of the complete supplemental application by the department.

(12) The department shall file with the hearing officer and serve on all parties a written analysis of the supplemental application not later than 10 days prior to the certification hearing.

(13) The recommended order of the hearing officer shall be submitted to the Board no later than 180 days after receipt of the supplemental application by the department.

(14) The hearing officer may alter any time limitation upon stipulation between the department and the applicant or for good cause shown by any party.

Specific Authority: 403.504(1)(6)(9), F.S. Law Implemented: 403.5065, 403.507, 403.517, F.S. History: New 5-7-74, Amended 12-27-77, Formerly 17-17.21, Amended 5-9-83.

17-17.241 Abandonment.

A site or portion thereof may be released from terms and conditions of a certification by order of the Board upon a finding that such site or portion thereof has been abandoned by the applicant. Board action for abandonment may be initiated either by:

(1) A petition by an applicant requesting release of all or part of the site from the terms and conditions of a certification previously issued. The petition shall specify:

(a) The site or portions thereof to be abandoned;

(b) The electrical power plant or generating capacity to be abandoned;

(c) Any changes in environmental impact expected to result from abandonment;

(d) The reasons why abandonment is desired.

(2) A petition alleging failure of an applicant to commence construction of an electrical power plant which has been certified, either within 15 years of the date of the issuance of such certification or within 15 years of the date construction was scheduled to commence on such plant, as shown in the application, whichever is the later date. For good cause shown, which shall include but not be limited to permitting delays, the time of abandonment under this subsection may be waived by the Board.
Specific Authority: 403.504(1)(8), F.S. Law Implemented: 403.509, F.S. History: New 5-7-74, Amended 12-27-77, Formerly 17-17.14(2), Amended 5-9-83.

PART II

17-17.51 General.

(1) The department adopts Part II of this chapter pursuant to the charge of the legislature to provide an efficient, centralized, and coordinated permitting process for evaluating the location of the transmission line corridors, the construction of transmission lines and maintenance of transmission line rights-of-way, and their effects on human health, safety and welfare, the environment, and electric power system reliability and integrity.

The purpose of Part II of this chapter is to implement the provisions of the Transmission Line Siting Act, an act relating to environmental permitting, and electric system reliability and integrity.

(2) The certification of a project shall constitute the sole license of the state and any agency as to the approval of the location of the transmission line corridors, the construction of transmission lines, and maintenance of the rights-of-way.
Specific Authority: 403.523(1), F.S. Law Implemented: 403.521, 403.531, F.S. History: New 11-20-80.

17-17.52 Definitions.

Words, terms, and phrases used in this chapter, unless otherwise indicated, shall have the meaning set forth in Section 403.522, Florida Statutes. In addition, the following words when used in this Part shall have the indicated meanings:

(1) "Act" means the Transmission Line Siting Act, Sections 403.520 through 403.535, F.S.

(2) "Construction" means any clearing of land, excavation or other action by the applicant which would alter the physical environment or ecology of a corridor, but does not include those activities essential for surveying, preliminary corridor evaluation or environmental studies.

(3) "Corridor" means the area proposed by a utility within which one or more transmission lines are to be located.

(4) "Maintenance" means the act of physically maintaining the transmission line right-of-way.

(5) "Right-of-way" (ROW) means that area within the certified corridor within which the transmission line or lines are to be located.

(6) "Secretary" means the Secretary of the Department of Environmental Regulation, or his duly authorized designee.
Specific Authority: 403.523(1), F.S. Law Implemented: 403.522, F.S. History: New 11-20-80.

17-17.53 Prohibitions.

No applicant shall construct or permit construction or any transmission line within a right-of-way within any corridor requiring certification under this act without an appropriate and currently valid certification issued by the Board pursuant to the requirements of this act. Any applicant may at any time perform construction activities otherwise authorized by law in rights-of-way owned or controlled by the applicant, so long as (1) the applicant has the authority to perform such activities under the Transmission Line Siting Act; or (2) the transmission line is in any way exempt from the Transmission Line Siting Act.

Specific Authority: 403.523(1), F.S.
Law Implemented: 403.524, F.S.
History: New 11-20-80.

17-17.54 Application for Corridor Certification, Amendments, Fee, Disbursement of Funds.

(1) Applications for certification shall follow the format and shall be supported by information and technical studies, as prescribed by DER form 17-1.122(118) FAC.

(a) After certification, a new application shall be made for each major change in transmission line corridor alignment unless such changes were alternatives specifically addressed in the original certification proceedings or otherwise agreed by the Department.

(b) A request to modify certification shall be filed for each minor change in transmission line corridor alignment unless such changes were alternatives specifically addressed in the original certification proceedings or otherwise agreed to by the Department.

(c) Expansions in right-of-way width will be considered modifications pursuant to Section 403.535, Florida Statutes, unless otherwise specifically addressed in the original certification proceedings.

(d) Amendments to an application for certification shall follow the format and shall be supported by information as prescribed by DER form 17-1.22(118).

(e) 40 copies of the certification application shall be submitted by the applicant to the department. The Department may provide in the application form, or by written agreement with the applicant, that less than 40 copies be submitted of parts of the certification application.

(2) The department shall provide a copy of the application to:

(a) The water management district as defined in Chapter 373, F.S., in whose jurisdiction the proposed transmission line corridor is to be located, the Department of Community Affairs, Public Service Commission, the Department of Natural Resources, Game and Fresh Water Fish Commission, and local governments in whose jurisdiction the proposed transmission line corridor is to be located, within 7 days of its receipt by the department.

(b) Any other agencies who in its judgement the department feels will be affected such as Regional Planning Councils, the Department of State, Division of Archives, History and Records Management, and Department of Transportation, or who have indicated interest in the proceedings, within 15 days of receipt of the application by the department.

(c) All other parties to the certification proceeding within 15 days of its receipt or within 7 days of their appearance, whichever is later.

(3) Any amendments made to the application shall be sent by the applicant to the hearing officer and to all parties to the proceeding. At least 14 copies of any amendments shall be sent to the Department. Amendments to an application shall follow the format and shall be supported by information as prescribed by DER form 17-1.122 (118) FAC.

(4) The appropriate application fee shall accompany any application and shall be a condition precedent to consideration or action on the application by the department.

(a) The application fee shall be in accord with the following schedule:

Length of Corridor or Line	Initial Fee
Shorter than 25 miles	\$ 6,000
25 miles or greater	\$ 2,500 plus \$ 200 per mile
Maximum Fee	\$ 15,000

(b) All fees required of the applicant under this Chapter are to be paid into the department's Grants and Donations Trust Fund and thereafter drawn upon by the department and other authorized agencies upon submittal of an invoice for costs incurred in processing the application. All such funds so deposited shall be subject to state auditing procedures. Any sums remaining after payment of authorized costs shall be refunded to the applicant within 90 days after the issuance or denial of certification or withdrawal of the application. The applicant shall be provided with an itemized accounting of the expenditures.

(c) The department and other authorized agencies may seek reimbursement from the fee for travel, notices, per diem, hearing costs, etc., on a quarterly basis. Contracts may be funded on a monthly basis. Salary monies billed against the fee shall not be reimbursed until all other expenses have been paid from the fund. In the event that the application fee is insufficient to cover all salary expenses charged against the fee, monies shall be disbursed on a proportionate basis until the fee is exhausted. It shall be the responsibility of the department to notify agencies in a timely manner of the total fee charged for the application, amounts committed, and amounts remaining available to meet expenses. Expenses in excess of the remaining fee shall be the responsibility of the agency incurring them.

(d) Any agency authorized to incur an expense for a contract for studies under this Chapter shall obtain prior approval from the department and give the department 19 days written notice of the intent to incur an expense for the contract.

Specific Authority: 403.523(1), F.S.
Law Implemented: 403.523, F.S.
History: New 11-20-80.

17-17.55 Hearing Officer Appointment, Duties and Powers.

(1) Within 7 days of receipt of an application, the department shall request the Division of Administrative Hearings to appoint a hearing

officer to conduct all hearings required by this act.

(2) The hearing officer shall have all duties and powers granted to hearing officers by Chapter 120 and 403, Florida Statutes, and the rules adopted pursuant thereto.

(3) The hearing officer may alter any time limitation upon stipulation between the department and the applicant or for good cause shown by any party.

Specific Authority: 403.523(1), F.S. Law Implemented: 403.523(5), 403.527(5), 403.525, 403.528, F.S. History: New 11-20-80.

17-17.56 Completeness of Application, Resolution Procedures.

(1) The department shall file, within 10 days of receipt of an application, a statement with the Division of Administrative Hearings and with the applicant declaring its position with regard to the completeness of the application.

(2) The department shall identify the sections of the application considered to be incomplete and shall present a brief statement as to the reasons for its position.

(3) If the department finds the application to be incomplete, the applicant shall file within 15 days of receipt by the department of the application, with the Division of Administrative Hearings and the department:

(a) a statement agreeing with the statement of the department and withdrawing the application, or

(b) a statement contesting the statement of the department and providing information in support of its position; or

(c) supplemental information which renders the application complete.

(4) If the statement of the Department is contested, the hearing officer shall schedule a hearing on the statement of completeness as expeditiously as possible, but no later than 30 days after the receipt of the application by the department.

(a) The designated hearing officer shall make his decision within 10 days of the hearing.

(b) If the hearing officer finds that the application is not complete, the applicant shall withdraw the application or supplement the application in a timely manner so as to render it complete.

(c) If the applicant supplements the application so as to render it complete, then the times provided in this Chapter shall run from the date of the filing of the supplemental information.

(d) If the hearing officer finds the application was complete at the time it was filed, then the times provided in this Chapter shall run from the date of the filing of said application.

Specific Authority: 403.523(1), F.S. Law Implemented: 403.523(3)(5), 403.525(2), F.S. History: New 11-20-80.

17-17.57 Insufficiency of Application-Consultation with Applicant, Resolution Procedures.

(1) Should the department or any agency listed in Section 403.508(8) FS. determine within 30 days after receipt of a complete application that an application is so insuffcient as to prevent proper evaluation of the corridor said agency shall so advise the department and the department shall arrange a meeting with the applicant and affected agency with 7 days

after making that determination to ascertain whether or not the insufficiency can be timely rectified.

(2) If such meeting indicates that said insufficiency cannot be timely rectified, the department shall so advise the hearing officer and all parties, at which time the department, applicant or any party may request that the hearing officer alter the time limits of the Act pursuant to Section 403.528, F.S.

(3) If the applicant contests the statement of the department or an agency on sufficiency, the department shall so advise the hearing officer and other parties. Within 15 days of being so advised the hearing officer shall schedule a hearing on this issue. The hearing shall be held no later than 30 days after the receipt of the department's or agency position. The hearing officer shall make a decision on this issue within 10 days of the hearing. If the hearing officer determines that the application is so insuffcent as to prevent proper evaluation of a corridor, then the applicant shall withdraw the application or correct this deficiency. The time limits may be adjusted accordingly. If the hearing officer determines that the application is sufficient, then the time provided in this Chapter shall run from the date of filing the application.

(4) An application which is determined to be sufficient as to a majority of its sections shall be processed for certification on a normal schedule so long as the schedule provides that a sufficient application is available to all parties at least 60 days prior to the certification hearing. Failure to provide these materials within such time shall be deemed good cause for delaying the certification hearing.

Specific Authority: 403.523(1), F.S. Law Implemented: 403.523(3)(5), 403.525(3), F.S. History: New 11-20-80.

17-17.58 Conduct of Studies, Supplementary Information.

(1) The department within 15 days of the filing of a complete application shall commence or contract for joint or independent studies of the certification application.

(2) Such studies shall include, but shall not be limited to, the consideration of the following criteria in regards to corridor location impacts, transmission line construction impacts, or right-of-way maintenance impacts, as applicable:

(a) Proposed location of transmission line crossings of navigable waters and transportation systems and the expected impact of such crossings;

(b) Impact on surrounding land uses and neighboring populations;

(c) Impact on public lands, submerged lands and wetlands;

(d) Impact on terrestrial and aquatic plant life and animal life, including endangered or threatened species;

(e) Impact on known or potential archaeological and historic sites and historic preservation areas as identified by the Department of State, Division of Archives, History and Records Management;

(f) Potential impacts to previously undisturbed or limited access areas due to increased access via the corridor.

(g) Potential electromagnetic effects.

(h) Site specific environmental

studies due to the particular nature of the corridor.

(i) Proposed mitigation measures associated with the construction of the transmission lines and rights-of way designed to minimize adverse effects on the environment;

(j) Impact on air quality;

(k) Impact on water quality and quantity including surface drainage and wetlands;

(l) Impacts related to clearing of the right-of-way; and

(m) Impacts related to construction of access roads and any other construction activities which may impact on wildlife and aquatic life.

(n) Methods proposed to be used for the maintenance of access roads and the right-of-way.

(3) Information, studies and data as provided herein or in application form 17-1.122(118) shall be furnished at the applicant's cost to the department, Department of Community Affairs, Public Service Commission, Department of Natural Resources, Division of Archives, History and Records Management, Game & Fresh Water Fish Commission, those Regional Planning Councils and affected local governments who become parties to the proceeding and each water management district as defined in Chapter 373, FS., in whose jurisdiction the proposed transmission line is to be located. Department or agency requests for additional information, if contested, shall be resolved by the hearing officer and shall be in conformance with all provisions of this Part and the Florida Administrative Procedures Act.

(4) The Department may waive or reduce in scope the studies and reports required by this section and the application form 17-1.122(118) FAC for transmission lines which are not exempt from the Transmission Line Siting Act, and which will require only the expansion of existing rights-of-way. The applicant may request, and the department shall grant, a meeting between the applicant, the department and all potential statutory parties which are known, to determine what studies and reports required by this section and the application form may be waived or reduced in scope for the particular application.
Specific Authority: 403.523(1), F.S.
Law Implemented: 403.523(2), 403.526(2), F.S. History: New 11-20-80.

17-17.59 Analysis by the Department, Agency Reports.

(1) The department shall file the written analysis required by 403.523(8) F.S., with the hearing officer and serve it on all parties no later than 3 months after the complete application is filed with the department, and no later than 30 days prior to the certification hearing.

(2) The analysis shall contain:

(a) an assessment of the impacts of the project as determined by the studies outlined in 17-17.58, F.A.C. (Conduct of Studies);

(b) expected compliance with state standards and any variance or exemptions thereto;

(c) conclusions and recommendations regarding certification including reasons for recommendations of denial, if the Department recommends denial of certification;

(d) recommendations for Conditions of Certification if the department intends to recommend certification.

(3) The analysis shall contain in addition to the department's evaluation, reports by other governmental agencies as specified by Section 403.523(8), and 403.526, F.S. These reports shall be submitted to the department no later than 60 days after receipt of the complete application by these agencies.
Specific Authority: 403.523(2), F.S. Law Implemented: 403.523(8), 403.526, F.S. History: New 11-20-80.

17-17.60 Conditions of Certification, Delegated Modifications.

(1) The conditions of certification shall recognize that the construction of the proposed transmission line will take place over a substantial period of time and that the exact right-of-way within the corridor may be subject to change because of land availablility and therefore, portions of the construction may be subject to further review by the department pursuant to the conditions of certification. The applicant shall notify the department in writing of any changes to the project as certified. The Department shall notify the parties of such changes.

(2) The Department shall request that the Board delegate authority to the Secretary to review and approve or disapprove the following modifications pursuant to Section 403.535(1), F.S.:

(a) A modification of the project that would not cause any significant adverse environmental impact.

(b) Modifications necessary to meet licensing conditions or requirements imposed on the applicant by any federal regulatory agency. The applicant shall notify the Department at least (30) days prior to the issuance of the federal license that would require such a modification.

(c) A reconstruction of a right-of-way or transmission line necessary to avoid or mitigate an emergency involving the loss of human life or property resulting from any natural or man-made cause, including hurricane, tornado, fire, flood, explosion, windstorm or other calamitous accident when new right-of-way or access facilities are necessary.

(d) Emergency replacement of previously existing right-of-way or transmission lines shall not be considered a modification pursuant to Section 403.535 F.S. A verbal report of the emergency shall be made to the department as soon as possible. Within fourteen (14) calendar days after correction of the emergency a report to the Department shall be made outlining the details of the emergency and the steps taken for its temporary relief. The report shall be a written description of all of the work performed and shall set forth any pollution control measures or mitigative measures which were utilized or are being utilized to prevent pollution of waters, harm to sensitive areas or alteration of archaeological or historical resources.

(3) The Department shall give notice to the parties to the original certification processing of any requests for modification received pursuant to this section.
Specific Authority: 403.523(1), F.S. Law Implemented: 403.531(2), 403.535(1), F.S. History: New 11-20-80.

17-17.61 Public Notice.

(1) The department shall provide for publication of the public notices necessary under this Chapter.

(2) Notice of Certification Hearing.

At least 60 days prior to the public hearing on certification, public notice shall be provided and shall consist of the following:

(a) Publication in a newspaper or general circulation which the departmental staff has determined to be adequate to provide general public notice in each county through which the transmission line corridor will pass. Such public notice which shall occupy not less than 1/4 of the newspaper page, bearing the heading, "Notice of Certification Hearing on Proposed Electrical Transmission Line Corridor", in bold letters not less than 3/8 inch high. The public notice shall contain the following information:

1. The name and brief description of the transmission line corridor;

2. A map to be supplied by the applicant showing the location of the corridor;

3. A list of readily accessible public places where copies of the application are available for public inspection and copying. The list shall include the addresses of the main and the local regional offices of the department serving the area of the corridor. The list shall also indicate that a copy of the application is available for public inspection at the general business office of the applicant, and the local business office of the applicant, if any, in every county through which the corridor will pass;

4. A statement that: "Application Number _____ for certification to authorize location of a transmission line corridor, construction of an electrical transmission line or lines and maintenance of the transmission line right-of-way from Florida, to _____, Florida, is now pending before the Department of Environmental Regulation pursuant to the Florida Transmission Line Siting Act, Chapter 403, Part II F.S. (The department's assigned application number shall be provided in the application number blank.) The corridor will pass through the following local government jurisdictions: ____" (Here list cities and counties as appropriate).

5. A statement that: "Pursuant to Section 403.527, Florida Statutes, the certification hearing will be held by the Division of Administrative Hearings on _____, 19 _, at _____, in _____ County, Florida, at _____m. to determine whether or not the location of the transmission line corridor, construction of the transmission lines and maintenance of the right-of-way, are consistent with the broad interests of the public and will produce minimal adverse effects on the environment and public health, safty and welfare. Consideration of individual private property rights, equitable compensation for condemnation proceedings which may be necessary to obtain access and use of the corridor, and the electrical need for the transmission line will not be heard at this hearing. Need for the transmission line has been predetermined by the Public Service Commission at a separate hearing."

6. Section 403.527(3) and (4), Florida Statutes, in their entirety.

(b) By the department mailing by certified mail return receipt requested within 10 days of publication of the notice required by (2)(a) a copy of said public notice to the chief executive of any municipality or county through which the corridor will pass.

(c) By the department mailing the appropriate notice to any person's who have requested to be placed on the department's mailing list for notification of transmission line certification hearings.

(d) Publication of an appropriate notice of the hearing in the Florida Administrative Weekly.

(e) Where known, the department shall advertise the applicant's intention to use, connect to or cross over properties and works of governmental agencies. The following statement shall be included in notices published pursuant to (2)(a): "Pursuant to Section 403.527(3)(e), F.S., (Name of Utility) intends to use, connect to, or cross over properties and work of the following agencies: ____________

____________ The hearing officer will receive comments and testimony from the parties, the public and the affected agencies at the certification hearing."

(f) Where known, the department shall advertise the applicant's desire to obtain a condition of certification that would constitute a variance otherwise allowed by law from a non-procedural standard or regulation of the department or a standard or regulation of any other agency. The department shall include an appropriate statement in notice published pursuant to (2)(a) such as: "Pursuant to Section 403.531, F.S., (Name of Utility) seeks a variance from (Rule, Agency) for the purpose of: ____________

____________ The hearing officer will receive comments and testimony on the variance request from the parties, the public and the affected agencies at the certification hearing."

(3) Notice on Completeness or Sufficiency Hearings.

Written notice of a hearing on the completeness or sufficiency of an application shall be given to all parties.

(4) Notice of Modification Request.

The Department shall provide notice of receipt of a modification request by publishing notice in the Administrative Weekly and by sending notice to the address shown on the last certificate of service for each party to the original certification proceedings. At its discretion, the Department may also publish notice in newspaper(s) of general circulation in each county through which the portion of the corridor proposed to be modified will pass, dependent upon the scope of modification requested.

(5) Notice of Hearing on a Modification Petition Pursuant to Subsection 403.535(3), F.S.

The department shall provide notice of hearing scheduled on a modification petition filed pursuant to Subsection 403.535(3), F.S., consisting of:

(a) Publication in newspapers of general circulation which the department staff has determined to be adequate to provide general public notice in each county in a newspaper or newspapers of general circulation, and through which the portion of the tranmission line corridor being modified will pass. Such public notice shall occupy not less than 1/4 of the newspaper page, bearing the heading, "Notice of Hearing to consider Modification to a previously certified Electrical Transmission Line Corridor located in _____ Counties, Florida," in bold letters not less than 3/8 inch high.

(b) The public notice shall contain the following information:

1. The name of the utility and brief description of the requested modification;

2. a map to be supplied by the applicant showing the location of the modification;

3. A list of readily accessible public places where copies of the modification petition are available for public inspection and copying. This list shall include the addresses of the main and the local regional offices of the department serving the area of the modification. This list shall also indicate that a copy of the modification petition is available for public inspection at the general business office of the applicant, if any, in every county in which the modification will located.

4. A statement that: "A modification petition numbered ________ to authorize a modification to the previously certified electrical transmission line from _____ Florida to ______, Florida, is now pending before the Department of Environmental Regulation, pursuant to the Transmission Line Siting Act, Chapter 403, Part II, F.S." (The departments assigned application number shall be provided in the blank.) "The modification will pass through the following local governmental jurisdictions: ____________

____

(Here list the Cities and Counties as appropriate).

5. A statement that: "Pursuant to Sections 403.527 and 403.535, Florida Statutes, a hearing regarding modification of a previously issued certification will be held by the Division of Administrative Hearings on _____, 19 _, at _____, in _________ County, Florida, at m., to determine whether or not the modification is consistent with the broad interests of the public and will produce minimal adverse effects on the environment and public health, safety and welfare. Considerations of individual private property rights, equitable compensation for condemnation proceedings which may be necessary to accomplish the modification, and the electrical need for the transmission line will not be heard at the modification hearing. Need for the transmission line has been predetermined by the Public Service Commission at a seperate hearing. All persons wishing to become parties to this proceedings should file a notice of intent to become a party with the department by (insert date)."

6. Section 403.527(3) and (4), Florida Statutes, in their entirety.

(c) By publication of appropriate notice in the Florida Administrative Weekly.

Specific Authority: 403.523(1), F.S.
Law Implemented: 403.523(9), 403.527, 403.535, 403.525, F.S.
History: New 11-20-80.

17-17.62 Evidence of Notice, Additional Notice.

(1) Evidence of any notice made

pursuant to this chapter, together with a copy of the notice, shall be filed with the hearing oflicer and all parties within ten (10) days of issuance or publication of said notice. A copy of each notice shall be served on each party on or before the date of publication and shall be made a part of the record of the proceedings.

(2) Inadvertent failure of service on, or to give notice to the public or any of the persons entitled to receive such services pursuant to provisions of this chapter, may be cured by an order of the hearing officer designed to afford the public or such persons adequate notice to enable their effective participation in the proceedings.

(3) The hearing officer may, at any time, require the department to serve or publish additional notices of hearing and file evidence thereof.

Specific Authority: 403.523(1), F.S. Law Implemented: 403.523(6)(9), 403.527, F.S. History: New 11-20-80.

17-17.63 Hearings Generally-Conduct, Public Service Commission's Determination of Need.

(1) The certification hearing held pursuant to the Act and this Chapter shall be conducted according to the provisions of Chapter 120, Florida Statutes.

(2) Pursuant to Section 366.14 F.S., the Public Service Commission has been directed to conduct a public hearing to determine the need for a transmission line regulated under Sections 403.520-535, F.S. The commission's determination of need is binding on all parties to the certification proceeding and is a condition precedent to the conduct of a certification hearing.

Specific Authority: 403.523(1), F.S. Law Implemented: 403.527(1), 403.537, 366.14(1), F.S. History: New 11-20-80.

17-17.64 Certification Hearings-Subject Matter, Procedure, Participants.

(1) The department shall arrange with the hearing officer for a certification hearing to be held no later than four (4) months after the filing of a complete application with the department, in a convenient public location as close as practicable to the proposed corridor.

(2) The certification hearing shall include an examination of the expected environmental impacts of the transmission line corridor, agency reports, other public interests and any issues deemed appropriate by the hearing officer. In preparing the recommended order, the hearing officer shall consider the legislative intent under Section 403.521, F.S.

(a) The applicant for certification shall make formal presentation of its proposal at this hearing and shall address each of the topics listed in (2) above. The presentations shall be designed to apprise the public otherwise unfamiliar with the the details of the proposal.

(b) All parties may present their respective cases in accordance with the rules of evidence in administrative proceedings at the hearing. These presentations may include the application and all studies, reports and analyses prepared in accordance with this Chapter.

(c) Any person not a party may present oral or written communications to the Hearing Officer at the hearing. If the hearing officer proposes to consider such communications the parties shall be given an opportunity to cross-examine or challenge or rebut such communications.

(d) Where the applicant seeks a condition in its certification which constitutes a variance from the non-procedural standards or regulations of the department or from the standards or regulations of any other agency, the applicant shall notify the agency whose standards or regulations are involved, all parties and the hearing officer at least 75 days prior to the certification hearing, of the standards or regulations from which it seeks a variance, of the notice given to the agency whose rules are involved, and of the condition which it seeks to have included in the certification on this issue.

(e) Where the applicant is aware of its need to use, connect to, or cross over any properties or works of any agency, the applicant shall notify the agency whose properties or works are affected, all parties and the hearing officer of this need at least 75 days prior to the certification hearing. This activity shall be an issue addressed in the certification hearing unless waived in writing by the agency involved.

(f) Parties who are granted permission for untimely intervention pursuant to subsection 403.527(3)(d), F.S. shall be bound by the status of the proceedings as they find them as of the date intervention is granted, unless otherwise ordered by the hearing officer in his discretion.

Specific Authority: 403.523(1), F.S. Law Implemented: 403.527(3)(4)(5), F.S. History: New 11-20-80.

17-17.65 Retention and Availability of Certification and Application, Copying Fees.

(1) The applicant shall at all times retain complete copies of the application and certification at the central business office, and if available, at least one business office in each county serving the area through which the corridor will pass. The applicant's copies of the application and certification shall be open for a public inspection and copying during normal business hours.

(2) The department shall retain complete copies of the application and certification at the main office and the local district offices for the districts through which the certified corridors will pass. The department's file shall be open for a public inspection and copying during normal business hours.

(3) A reasonable fee may be charged by any party for providing copies pursuant to this chapter.

Specific Authority: 403.523(1), F.S. Law Implemented: 403.527, F.S. History: New 11-20-80.

17-17.66 Post-certification Monitoring and Reporting.

(1) The applicant shall conduct at its expense such post-certification monitoring and reporting as is deemed reasonable by the Board, of the environmental effects arising from the location of the transmission line right-of-way, the construction of the transmission line or lines and the maintenance of the transmission line right-of-way pursuant to the conditions of certification. The monitoring and reporting shall be carried out in the manner prescribed in the conditions of certification.

Specific Authority: 403.532(1), F.S. Law Implemented: 403.523(10), F.S. History: New 11-20-80.

17-17.67 Review and Evaluation.

The department may at any time, review the certification and evaluate the compliance of the applicant with the conditions of certification contained therein and act upon such review and evaluation as it deems appropriate in accordance with the provisions of the Act and this Part.

Specific Authority: 403.523(1), F.S. Law Implemented: 403.532, 403.533, F.S. History: New 11-20-80.

17-17.68 Modification of Certification, Fee.

(1) Certification, including Conditions of Certification, may be modified pursuant to the provisions of Section 403.535, F.S. Any request for modification of certification shall be accompanied by 14 copies of the appropriate alterations of the original application as prescribed by DER Form 17-1.122(118).

(2) If modification pursuant to Subsections 403.535(2) or (3) is sought, the applicant shall submit a $2000 modification fee to the department, unless otherwise stipulated to by the department. Any sums remaining after payment of authorized costs shall be refunded to the applicant within 90 days of approval or denial of the modification by the Board, or withdrawal of the modification.

(3) Upon receipt of a request to modify certification, the Department shall issue notice as prescribed by Section 17-17.61(4), FAC.

Specific Authority: 403.523(1), F.S. Law Implemented: 403.523(11), 403.535, F.S. History: New 11-20-80.

17-17.69 Processing of Modification Petition Pursuant to Section 403.535(3) F.S.

(1) The department shall issue notice of the receipt of a modification petition to the public and affected agencies and all parties to the original certification proceedings by certified mail within 15 days of receipt of the modification petition by the department.

(2) Parties to the original certification proceedings may become parties to the modification proceedings by filing a notice of intent to become a party with the department within thirty (30) days of the publication of the notice required by (1) of this section. Section 403.527(3)(4), shall act as a guide for any other agency or person in becoming a party.

(3) The department shall request assignment of a hearing officer or notify the Secretary within 7 days of receipt of a modification petition by the department.

(4) The provisions of Section 17-17.56 and 17-17.57 relating to completeness and sufficiency shall apply to the review of a modification petition.

(5) The Public Service Commission, Department of Community Affairs, Department of Natural Resources, Game and Fresh Water Fish Commission and each water management district as defined in Chapter 373, F.S., in whose jurisdiction the modification would be located each shall submit a report on the modification petition to the department within 45 days of receipt of the modification petition by these agencies.

(6) The department shall perform similar studies to those required by Section 17-17.58 within 60 days of receipt of the modification petition.

(7) The scope of studies and reports required by (5) and (6) above shall be commensurate with the degree of modification requested.

(8) The department shall arrange to have a public notice regarding the modification hearing published pursuant to Section 17-17.61(4) within 45 days of receipt of the modification petition by the department.

(9) The hearing officer shall hold a modification hearing on the modification not later than 95 days after receipt of the modification petition by the department.

(10) The department shall file with the hearing officer and serve on all parties a written analysis of the modification petition not later than 21 days prior to the modification hearing.

(11) The recommended order of the hearing officer shall be submitted to the Board for final action no later than 30 days after completion of the modification hearing.

(12) The hearing officer may alter any time limitation upon stipulation between the department and the applicant or for good cause shown by any party.

Specific Authority: 403.523(1), F.S. Law Implemented: 403.523(3)(6)(8)(9), 403.526, 403.527, 403.535, F.S. History: New 11-20-80.

17-17.70 Revocation or Suspension of Certification.

(1) Any material false statement, noncompliance with terms or conditions of a certification or violation of Chapter 403 or regulations or orders issued thereunder shall be grounds for revocation or suspension of certification.

(2) The department shall initiate a public hearing for revocation or suspension of certification and notify the applicant, pursuant to the provisions of Chapter 120, F.S.

(3) The applicant, if so ordered by the hearing officer shall immediately terminate all activities found to be in violation of the certification, pending final resolution of the revocation or suspension proceedings by the Board.

(4) Subsection (3) above shall not interpreted as requiring the termination of environmental studies, or monitoring by the Department or the applicant. The department may terminate, at its discretion, such activities by written notice to the persons conducting such activities, and to the parties to the certification hearing.

(5) The department may, at its discretion, cause to be conducted any investigations, monitoring or studies except those related to need deemed appropriate in contemplation or in pursuance of suspension or revocation proceedings.

Specific Authority: 403.523(1), F.S. Law Implemented: 403.532, F.S. History: New 11-20-80.

17-17.71 Termination of Certification.

The applicant shall commence construction of a transmission line which has been certified within 15 years of the date of certification as shown in the application, or certification shall be terminated. For good cause shown, which shall include, but not be limited to, permitting delays, the certification expiration time prior to commencement of construction activities may be extended by the Board.

Specific Authority: 403.523(1)(8), F.S. Law Implemented: 403.529, F.S. History: New 11-20-80.

ATTACHMENT V

PUBLIC SERVICE COMMISSION

POWER PLANT SITING REGULATIONS

25-22.75 Transmission Line Permitting Proceedings.

(1) Proceedings to determine the need for a proposed transmission line as defined in Section 403.522(3), F.S., shall begin with a petition by a utility or an order issued on the Commission's own motion and shall be disposed of as provided in Chapter 25-2, F.A.C., except that the time deadlines and notice requirements in Section 366.14, F.S., shall control. Proceedings may begin notwithstanding the fact that an application for corridor site certification of a proposed transmission line pursuant to sections 403.502 through 403.535, F.S., is pending. A petition for reconsideration shall be filed within 5 days of the Commission's decision.

(2) Upon receipt of a petition by a utility or issuance of an order pursuant to subsection (1), notice shall be given of the commencement of the proceeding to:

(a) The affected utility or utilities, if appropriate;

(b) The Department of Community Affairs, Division of Local Resource Management;

(c) The Department of Environmental Regulation; and

(d) Each person who has requested placement on the mailing list for receipt of such notice.

Specific Authority: 120.53(1)(c), 350.01(6), 403.537(2) F.S. Law Implemented: 403.537 F.S. History—New 12-2-80, Transferred 12-21-81.

25-22.76 Contents of Petition. Petitions submitted to commence a determination of need proceeding or responses to the Commission's order commencing a proceeding shall comply with the other requirements of Chapter 25-2, F.A.C., as to form and style and shall contain the following information:

(1) A general description of the existing load and electrical characteristics of the electrical transmission grid including an electrical system map indicating the general location and configuration of existing and the proposed transmission line or lines.

(2) A general description of the proposed transmission line or lines, including the project name, the starting and ending points of the transmission line or lines as defined by the utility, the design and the operating voltage of the proposed transmission line or lines, the approximate cost, and the projected in-service date or dates of the proposed transmission line or lines.

(3) A statement of the specific situations, conditions, contingencies, or other factors which indicate that need exists for the proposed transmission line or lines, including the general time within which the proposed transmission line or lines will be needed. Documentation shall include load flow studies on a peninsular Florida basis, a Gulf Power basis, a Southern Electric System basis or some combination of these and, when applicable, inclusion of adjoining states showing power flows and voltage profiles on the transmission lines in the more critical operating conditions. Load flows should cover the general time period within which the proposed transmission line or lines will be needed, but at the option of the utility, may cover a period of several years. One copy of the complete load flow analysis, including supporting documentation shall be filed with the Commission. The load flow analysis shall identify the load forecasts upon which the load levels are based. Supplemental studies, such as transient stability or short circuit analysis, may be submitted at the option of the utility or upon request of the Commission, if needed to support the need for the proposed transmission line or lines.

(4) A summary discussion of the major alternative transmission lines or transmission improvements which were examined and evluated by the utility in arriving at the decision to pursue the proposed project. The discussion shall consist of: (a) a general description of the other transmission line alternatives, including, if appropriate, load flow analyses and electrical system diagrams showing power flows and voltage profiles on the transmission lines in the more critical operating conditions and (b) a discussion of the performance of each alternative in terms of economics, reliability, long-term flexibility and usefulness, or other relevant factors.

(5) A statement of the major reason or reasons for adding the proposed transmission line or lines, specifically whether the proposed transmission line or lines, specifically whether the proposed transmission line or lines will:

(a) Improve or maintain reliability;

(b) Improve intra- or inter-system power transfer capabilities;

(c) Integrate power supply sources;

(d) Correct thermal overloads or low voltage conditions;

(e) Accommodate load growth;

(f) Improve system economics;

(g) Accommodate relocations;

(h) Conserve or displace oil;

(i) Serve any other useful purpose;

(j) Any combination of the above.

(6) A statement of the adverse consequences to the electrical system which will result if the project is delayed or if the Commission denies the application.

(7) An estimate of the time for full project development and an explanation of the factors and considerations which justify the proposed phasing of the project where development of the project will be phased over an extended period of time.

Specific Authority: 120.53(1)(c), 403.537(2) F.S. Law Implemented: 403.537 F.S. History—New 12-2-80, Transferred 12-21-81.

25-22.77 Reserved

25-22.78 Reserved

25-22.79 Reserved

25-22.80 Electrical Power Plant Permitting Proceedings.

(1) Proceedings to determine the need for a proposed electrical power plant, as defined in Section

403.503(7), F.S., shall begin with a petition by a utility or on the Commission's own motion and shall be disposed of in accordance with the provisions of Chapter 25-2, F.A.C., except that the time deadlines set forth in this rule and in Sections 403.501 through 403.517, F.S., to the extent applicable, shall control. Proceedings may begin prior to the filing of an application for site certification of the proposed electrical power plant.

(2) Within 7 days following receipt of a petition, or in its order commencing a proceeding on its own motion, the Commission shall set a date for hearing, which shall be within 90 days of receipt of the petition or of issuance of its order. Following the hearing, each party may make submittals to the Commission on a time schedule to be determined in accordance with the requirements of each proceeding, but terminating no later than 120 days from the receipt of the petition. The matter will be placed before the Commission on an agenda which will permit a decision no later than 135 days from the date of receiving the petition or the issuance of the order commencing the proceeding. A petition for reconsideration must be filed within 5 days of the Commission's decision.

(3) Upon receipt of a petition by a utility or issuance of an order pursuant to subsection (1), notice shall be given of the commencement of the proceeding to:

(a) The affected utility or utilities, if appropriate:

(b) The Department of Community Affairs, Division of Local Resource Management:

(c) The Department of Environmental Regulation; and

(d) Each person who has requested placement on the mailing list for receipt of such notice.

Specific Authority: 120.53(1)(c), 350.01(6), 366.05(1) F.S. Law Implemented: 403.519 F.S. History—New 12-2-80, Transferred 12-21-81.

25-22.81 Contents of Petition. Petitions submitted to commence a proceeding to determine the need for a proposed electrical power plant or responses to the Commission's order commencing such a proceeding shall comply with the other requirements of Chapter 25-2, F.A.C., as to form and style except that a utility may, at its option, submit its petition in the same format and style as its application for site certification pursuant to Sections 403.501 through 403.517, F.S., so long as the informational requirements of this rule and Chapter 25-2, F.A.C., are satisfied. The petition, to allow the Commission to take into account the need for electric system reliability and integrity, the need for adequate reasonable cost electricity, and the need to determine whether the proposed plant is the most cost effective alternative available, shall contain the following information:

(1) A general description of the utility or utilities primarily affected, including the load and electrical characteristics, generating capability, and interconnections.

(2) A general description of the proposed electrical power plant, including the size, number of units, fuel type and supply modes, the approximate costs, and projected in-service date of dates.

(3) A statement of the specific conditions, contingencies or other factors which indicate a need for the proposed electrical power plant including the general time within which the generating units will be needed. Documentation shall include historical and forecasted summer and winter peaks, number of customers, net energy for load, and load factors with a discussion of the more critical operating conditions. Load forecasts shall identify the model or models on which they were based and shall include sufficient detail to permit analysis of the model or models. If a determination is sought on some basis in addition to or in lieu of capacity needs, such as oil blackout, then detailed analysis and supporting documentation of the costs and benefits is required.

(4) A summary discussion of the major available generating alternatives which were examined and evaluated in arriving at the decision to pursue the proposed generating unit. The discussion shall include a general description of the generating unit alternatives, including purchases where appropriate; and an evaluation of each alternative in terms of economics, reliability, long term flexibility and usefulness and any other relevant factors. Those major generating technologies generally available and potentially appropriate for the timing of the proposed plant and other conditions specific to it shall be discussed.

(5) A discussion of viable nongenerating alternatives including an evaluation of the nature and extent of reductions in the growth rates of peak demand, KWH consumption and oil consumption resulting from the goals and programs adopted pursuant to the Florida Energy Efficiency and Conservation Act both historically and prospectively and the effects on the timing and size of the proposed plant.

(6) An evaluation of the adverse consequences which will result if the proposed electrical power plant is not added in the approximate size sought or in the approximate time sought.

Specific Authority: 120.53(1)(c), 366.05(1) F.S. Law Implemented: 403.519 F.S. History—New 12-2-80, Transferred 12-21-81.

25-22.82 Reserved

25-22.83 Reserved

25-22.84 Reserved

ATTACHMENT VI

EQUIVALENCIES AND CONVERSIONS

DRAFT

GLOSSARY

Aldehydes - Group of highly reactive organic compounds containing the CO which attached to both a hydrogen atom and a hydrocarbon radical.

Alkalinity - The quality, state, or degree of having a pH more than seven.

Alpha - Closest in structure of an organic molecule to a the nucleus of a helium atom carrying a positive charge of +2.

Ambient - Surrounding on all sides , such as in ambient air quality standards.

Anadromous - Having the habit of migrating from deep water to shallow water to breed.

Anions - Negatively charged ions.

Anthracite - a hard compact natural coal of high luster differing from bituminous coal in that it contains only a small amount of volatile matter and burns with a nearly smokeless flame.

Aquatic Ecosystems - Water ecological system formed by the interaction of organisms and their environment.

Aquifer - A water-bearing bed of permeable rock, sand, or gravel capable of yielding considerable quantities of water to wells or springs.

Aromatic - Relating to or having an aroma.

Bag House - An air pollution control technique in which bag filters are used for filtering gas.

Base Load - The minimum load in a power system over a given period of time.

Beneficiation - Process of cleaning coal to reduce the amount and sulfur in the coal.

Benthic - Relating to or occuring on the bottom layer of a body of water.

Benthos - Plant or animal life living at the bottom of the sea, especially in the deeper parts.

Berm - A narrow shelf, edge, or path typically at the bottom or top of a slope or along a bank.

Biomagnification - A type of food chain transfer with increasing levels of a substance.

Biofouling - The adhesion of various marine organisms to underwater structures.

Biomass - The amount of living matter in the form of one or more kinds of organisms present in a particular habitat.

Biota - The animal and plant life of a region.

Bituminous - A coal that yields, when heated, considerable volatile bituminous matter; also called "soft coal."

Blowdown - Water discharged from a cooling system to eliminate contaminating chemicals.

BOD - Biochemical oxygen demand, amount of oxygen used in the biological decay process.

Bottom Ash - Dry ash that does not melt, but is too heavy to be entrained in the flue gas, is also known as cinders.

Brackish - Somewhat salty water that contains less salt than seawater, but is undrinkable.

T

Btu (British Thermal Unit) - The standard unit for measuring quantity of heat energy, such as the heat content of fuel. It is the amount of heat energy necessary to raise the temperature of one pound of water one degree Fahrenheit.

Busbar - A equalizer conductor from a terminal or junction point in a power system, for the connection of supplies and feeders.

Capacity -Maxium power output, expressed in kilowatts or megawatts.

Carcinogenic - Cancer producing.

Catalyst - A substance which speeds up a chemical reaction without entering the reaction.

Catalytic Oxidation - Increases the process involving the addition of oxygen or the loss of hydrogen, while remaining unchanged.

Cations - A positively charged ion.

Cogeneration - Use of fuel and boiler to generate electricity and useable thermal energy in a two stage process.

Conservation - Improving the efficiency of energy use; using less energy to produce the same product.

Coliform - Resembles colon bacilli, i.e, intestinal bacteria.

Condemnation - process by which the property of a private owner is taken for public use without the consent of the owner, but with a payment of just compensation.

Cooling Tower - A tower used to cool water after circulation through a condenser.

Copepods - Of or belonging to the copepoda family, minute aquatic crusteaceans.

Demand - The rate at which electric energy is delivered to or by a system and is expressed in kilovolts, also see Load.

Demineralizer - An apparatus for demineralizing water.

Depauperate - Falling short of natural development or size.

Dewatering - To remove water by draining, pressing, and pumping.

Discounted - To make a deduction in evaluating the significance or worth of something. reduce for value & inflation

Dry Cooling - In a dry cooling tower, the condenser cooling water rejects its heat to the air in a totally enclosed system, which is similar to the cooling system in an automobile.

Easement - Limiting the property use of a parcel of land.

Ecotone - A transition area between two adjacent ecological communities.

Edema - Extended swelling of plant organs or parts of organs from an over development of cells induced by excess of water combined with unfavorable light and temperature relationships.

Electrostatic Precipators - Device for removing fine particulate matter in an air stream by use of electro-magnetic fields.

Elutriation - The removal of substances from a mixture by washing and the use of liquid sludge.

Eminent Domain - The power to take private property for public use, either permanently or for a period of time.

Entrainment - The flowing in of organims due to the mass motion of the cooling water.

Entrainer - A liquid added as a third component to liquid mixtures for aiding their separation by fractional distillation.

Entrapment - The prevention of the escape of organisms due to the mass cooling water currents and forces involved.

Escalation - The upward adjustment of prices proportionally and automatically to an alteration in the cost of materials and labor.

Estuary - Place where freshwater joins saltwater.

Eutrophication - Process of aging of lakes and other still water bodies due to excess nutrients.

Evapotranspiration - Loss of water from the soil by both evaporation from the surface and by transpiration from plants

Extra-High Voltage (EHV) - Voltage over 345,000 volts (345kV).

Fee Simple Transfer - Outright purchase.

Flue - A channel in a chimney for conveying flame and smoke to the outer air,

Fly Ash - A fine ash from the pulverized fuel burned in power stations.

Gigawatt - One billion watts.

Gigawatt-Hour - One million kilowatt hours or one billion watt hours.

Gypsum Processes - Flue gas desulferization process that produces gypsum.

Halogen - Any of the five elements fluorine, chlorine, bromine, iodine, and astatine forming part of Group VIIIA of the periodic table of elements and existing in the free state normally as diatomic molecules (such a Cl_2 Br_2).

Hardpan - A cemented or compacted layer in soils through which it is difficult to dig or excavate.

Hydric - Characterized by an abundant supply of moisture.

Hydroperiod - The frequency that water stands at or above the soil surface or saturates the soil in the root zone of the existing wetland vegetation.

Ichthyoplankton - The fish component of the passively floating or weakly swimming animal microrganisms of the sea.

Impingement - A situation in which an organism is forced against a barrier, such as an intake screen, as a result of the intake of water into a facility such as a powerplant.

Intertie - In any framed work, a horizontal tie other than the sill and plate or other principal ties, securing up rights to one another (Line Connecting two utility transmission systems.

Isopleth - Lines on a map connecting points at which a given variable has a specified constant value.

Isotherm - A line drawn on a map through places having equal temperature.

Iterative - Describes a procedure or process which repeatedly executes a series of operations until some condition is satisfied.

Karst - Uneven limestone topography characterized by sink-holes.

Kilowatt - 1000 watts.

Kilowatt-Hour - The basic unit of electric energy equal to one kilowatt of power supplied to or taken from an electric circuit steadily for one hour.

Leaching - The removal, by percolation water of mineral salts from the soil.

Leachate - Liquid that has passed through or emerged from solid waste and contains soluble materials removed from the solid waste.

Lenticular - Shaped like a double convex lens.

Lignite - Dull brown compact fossil (wood), representing one stage in the conversion of plant remains into coal.

Load - The amount of electric power delivered to a given point on ~~the~~ an electrical system.

Load Factor - The ratio of the average load in kilowatts supplied during a designated period to the peak or maximum load in kilowatts occuring in that period.

Loss - The general term applied to energy (kilowatthours) and power (kilowatts) lost in the operation of an electrical system.

Loss of Load Probability - Probability that at some unspecified moment in a period, frequently the peak, the utility will not be able to meet it's demand.

Macrophyte - Member of macroscopic aquatic plant life capable of being seen with the naked eye.

Makeup - The water being added to a cooling system to replace that lost by evaporation or blowdonwn.

Mechanical Draft Cooling Towers - A type of cooling tower that uses fans to control the amount of air used to cool heated water.

Megawatt - 1000 kilowatts.

Megawatt-Hour - 1000 kilowatt hours.

Mesic Hammock - An cluster of hardwood trees that is somewhat higher than it's surrondings and is characterized by a moderate amount of moisture.

Miscible - Capable of being mixed.

Mutagenic - Capable of inducing mutation.

Natural Draft Cooling Tower - A type of cooling tower 300 to 500 foot tall that uses the process of evaporation to cool heated waste water.

Nekton - Free swimming organisms, such as fish.

Net Energy For Load - A term used by the public service commission and includes the net generation produced by the systems own plant, plus; energy recieved from other power plants, minus; energy sold to others.

Organic - Showing the characteristics of a living organisms and usually has carbon compounds.

Pathological - Altered or caused by disease.

Particulates - Finely divided solid or liquified particles in the air or in an emission.

Peak Load - The greatest of all demands of ~~the~~ electric load ~~under~~ c~~onsideratio~~n which has occured during a specified p~~eriod of ti~~me. See Demand and Load.

Percolation - Movement of water from the surface into the ground.

Permeability - Facility with which a porous substance permits passage of a fluid.

Phytoplankton - Passively floating plant life in a body of water consisting mostly of diatoms and blue-green algae.

Podsolization - A important process in the formation and modification of certain soils, especially in humid regions.

Potentiometric - Relating to an instrument for the precise measurement of electromotive forces. No define?

Pozzolanic - Having the properties of pozzolana, a volcanic dust that has the effect, when mixed with mortar, of enabling the latter to harden either in the air or under water.

Present Worth Value - The investment necessary to secure the promise of future payment. reword

Pulmonary - Pertaining to the lungs.

Raptor - Bird of prey.

Regenerative Processes - The utilization by special devices of heat or other products that would ordinarily be lost.

Riparian - Relating to or locating on the bank of a water course or sometimes a lake.

Scavenging - To remove dirt, waste or impurities from a substance.

Slurry - A watery mixture of insoluble matter.

Spoil - Dredged material which has to be placed at another site (Material excavated from below the surface of a body of water.

Stochastic - Random, having an element of chance.

Stoichiometry - Methodology and technology by which quantities of reactants and products in chemical reactions are determined.

Successional Stages - Progression of vegetative growth from herbaceous to woody.

Temperature Inversion - An increase of temperature with height through a layer of air which tends to trap the air below it.

Teratogenic - Causes congenital malformation or birth defects.

Therm - 100,000 Btu

Throw Away Process - Type of flue gas desulfurzation process, which results in valueless byproducts.

Traveling Screens - Rotating mesh screen attached to a power plant in-take to prevent the intake of materials that could clog the heat exchangers.

Toxic - Related to or caused by poision.

Watt - The electrical unit of power or rate of doing work.

Weir - A dam placed across a river to raise the water level, or the crest or spillway of a dam.

Xeric - Characterized by a scanty supply of moisture

Zooplankton - Floating aquatic micro-organisms.

ATTACHMENT VII

EQUIVALENCIES AND CONVERSIONS

ATTACHMENT VII

EQUIVALENCIES AND CONVERSIONS

The following are units of measurement which are used with some regularity in power plant siting applications:

Britsh	Metric
1 inch	2.54 centimeters (cm)
1 foot	0.3048 meters
1 mile	1.609 kilometers (km)
1 square foot	9,290 square centimeters
1 acre	4,047 square meter
1 cubic foot	28,316 cubic centimeters
1 gallon	3.785 liters
1 cubic yard	0.7647 cubic meter
1 pound	0.454 kilograms
1 ton (short)	0.9072 metric ton
1 pound per square inch	0.0703 kilogram per square centimeter
1 pound per cubic foot	0.01602 kilogram per square kilometer
1 ton per square foot	9,765 kilograms per square meter
1 part per million	1 milligram per liter (equivalent)
1 British thermal unit (Btu)	252 calories
1 pound per million Btu	0.43 grams per million joules 1.80 grams per million calories
1 Btu per pound	2.324 joules per gram; 0.555 calories calories per gram
1 kilogram per hectacre	2.676 pounds per acre

ATTACHMENT VIII

ACRONYMS AND ABBREVIATIONS

ACRONYMS

AC -- Alternating Current
BACT -- Best Available Control Technology
BLWM -- Bureau of Land and Water Management
BOD -- biological oxygen demand
Btu -- British Thermal Unit
CEC -- Cation Exchange Capacity
CFM -- cubic feet per minute
CO -- carbon monoxide
CO2 -- carbon dioxide
COE -- U. S. Corps of Engineers
CSP -- coal slurry pipeline
CWS -- cooling water system
CZM -- coastal zone management
Cal -- calorie
DC -- direct current
DCA -- Florida Dept. of Community Affairs
DER -- Florida Department of Environmental Regulation
DOAH -- Florida Division of Administrative Hearings
DOE -- U.S Department of Energy
DRI -- Development of Regional Impact
EHV -- Extra-high voltage
EIS -- Environmental Impact Statement
EPA -- U. S. Environmental Protection Agency
EPRI -- Electric power research institute
ESE -- Environmental Science and Engineering, Inc.
ESP -- Electrostatic Precipitator
FAAQS -- Florida Ambient Air Quality Standard
FAC -- Florida Administrative Code
FCG -- Florida Electric Coordinating Group
FEECA -- Florida Energy Efficiency and Conservation Act
FGD -- Flue Gas desulfurization
FPC -- Florida Power Coporation
FPL -- Florida Power and Light
FS -- Factor of Safety
FWS -- U.S. Fish and Wildlife Service
G/m3 -- Grams per cubic meter
GEO -- Governor's Energy Office
GFC -- Florida Game and Freshwater Fish Commission
GPC -- Gulf Power Corporation
GPD -- Gallons per day
GPM -- Gallons per minute

GW -- Gigawatts
GWH -- Gigawatt-hours
H2SO4 -- Sulfuric acid
HP -- Horsepower
HZ -- Herz (i.e., cycles per second)
Ha -- hectare
ILL -- Interlibrary loan
JEA -- Jacksonville Electric Authority
JTU -- Jackson Turbidity Units
KG -- Kilograms
KJ -- Kilojoules
KM -- Kilometers
KV -- Kilovolt
KV/M -- Kilovolt per meter
KW -- Kilowatt
KWH -- Kilowatt per hour
LAK -- City of Lakeland Utilities
LC50 -- Lethal Concentration, 50% mortality
LOLP -- Loss of load probability
MGD -- Million gallons per day
MHW -- Mean high water
MMTPY -- Million tons per year
MMBtu -- Million Btu
MSL -- Mean sea level
MW -- Megawatt
MWH -- Megawatt-hours
MWe -- Megawatt (electric)
MWt -- Megawatt (thermal)
NAAQS -- National Ambient Air Quality Standards
NANO- -- 10 to the minus ninth
NOx -- Nitrogen oxides
NPDES -- National Pollution Dishcarge Elimination System
NSPS -- New Source Performance Standards
OUC -- Orlando Utilities Commission
pH -- Meaure of acidity or alkalinity
POD -- Point of discharge
PPB -- Parts per billion
PPM -- Parts per million
PPSA -- Power Plant Siting Act
PSC -- Florida Public Service Commission
PSD -- Prevention of Significant Deterioration
RBW -- Receiving body of water
RDF -- Refuse-derived fuel
RET -- Rare, endangered or threatened species
ROW -- Right of way

RPC	--	Regional Planning Council
RRF	--	Resource recovery facility
SECI	--	Seminole Electric Cooperative, Inc.
SIP	--	State Implementation Plan
SJRPP	--	ST. John's River Power Plant
SO2	--	Sulfur Dioxide
SOx	--	Sulfur oxides
STAR	--	Service Through Applied Research (Board of Regents, State of Florida)
STPE	--	Sewage treatment plant effluent
TAL	--	City of Tallahassee Utilities
TDS	--	Total Dissolved Solids
TECO	--	Tampa Electric Co.
TLSA	--	Transmission Line Siting Act
TPD	--	Tons per day
TPY	--	Tons per year
TSP	--	Total Suspended Particulates
TSS	--	Total Suspended Solids
UG	--	Micrograms
UG/M3	--	micrograms per cubic meter
USGS	--	U.S. Geologic Survey

ATTACHMENT IX

DIRECTORY

ATTACHMENT IX

DIRECTORY OF AGENCIES

FREQUENTLY TAKING PART IN POWER PLANT AND TRANSMISSION LINE SITING IN FLORIDA

A. FEDERAL AGENCIES

1. Army Corps of Engineers
   Jacksonville District Office
   Nancy Schwall
   P. O. Box 4970
   Jacksonville, FL 32201

2. Environmental Protection Agency
   Region IV Office
   345 Courtland St. N. E.
   Atlanta, GA 30365

3. Federal Aviation Administration
   Carl Stokoe
   Southern Regional Office
   P. O. Box 20636
   Atlanta, GA 30320

4. Fish and Wildlife Service
   Lloyd Stith
   5612 June Ave
   Panama City, FL 32405

   Regional Director
   17 Executive Park Dr. N. E.
   Atlanta GA 30329

5. National Marine Fisheries
Ed Keppner
Area Superviser
3500 Delwood Beach Rd.
Panama City, FL 32407

6. National Park Service
John Christiano
655 Parfet St.
P. O. Box 25287
Denver, CO 80225

B. STATE AGENCIES

DEPT. OF ENVIRONMENTAL REGULATION
Twin Towers Bldg.
2600 Blair Stone Rd.
Tallahassee, FL 32301

Division of Environmental Programs

Bureau of Air Quality Management	Clair Fancy Assistant Bureau Chief (904) 488-1344
Air Modeling Section	Larry George (904) 488-1344
New Source Review Section	Bob King (904) 488-1344
Bureau of Ground Water	Dr. Rodney DeHan, Chief (904) 488-3601
Bureau of Water Quality Management	Don Kell (904) 488-3601
Hazardous Waste Section	
Solid Waste Section	John Reese
Resource Recovery Program	Ray Moreau (904) 488-0300

Division of Environmental Permitting

Bureau of Permitting
Power Plant Siting Program

Suzanne Walker, Chief
Hamilton ("Buck") Oven
Adminstrator
Karen Anthony
(904) 488-0130

II. OTHER STATE AGENCIES

1. Dept. of Community Affairs
   Paul Darst
   2751 Executive Center Cir. E
   Tallahassee, FL 32301
   (904) 488-4925

2. Game and Freshwater Fish Commission
   Randy Kautz
   Senior Biologist
   Environmental Services Office
   Bryant Bldg.
   620 So. Meridian
   Tallahassee, FL 32304
   (904) 488-6661

3. Dept. of Natural Resources
   Casey Fitzgerald
   Land Planner
   Bureau of State Land Management
   3300 Commonwealth Bldg., Room 203
   Tallahassee, FL 32303
   (904) 488-9120

Charles Knight
Bureau of Environmental Land Management
3300 Commonwealth Bldg.
Tallahassee, FL 32303
(904) 488-9120

4. Office of the Public Counsel
Steve Burgess
Holland Bldg.
Tallahassee, FL 32301
(904) 488-9330

5. Public Service Commission
Bob Trapp
Electric and Gas Dept.
700 South Adams St.
Tallahassee FL 32301
(904) 488-8501

6. Dept. of State
Louis Tesar
Historic Preservationist
Bureau of Historic Preservation
Div. of Archives, History and Records Mgt.
Room 405, R. A. Gray Bldg.
401 E. Gaines St.
Tallahassee, FL 32301
(904) 488-2333

7. Dept. of Transportation
Ed McNeely
Office of Transportation Priorities
Burns Bldg.
Tallahassee, FL 32301
(904)488-1970

ATTACHMENT X

BIBLIOGRAPHY

ATTACHMENT X

POWER PLANT SITING BIBLIOGRAPHY

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